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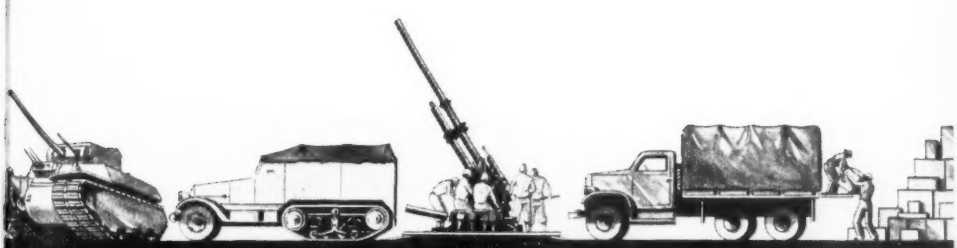

COMMAND AND GENERAL STAFF SCHOOL

FORT LEAVENWORTH, KANSAS

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A MONTHLY REVIEW OF MILITARY LITERATURE

Happy New Year

The year 1945 will stand out in history as the year which brought an end to World War II. May the incoming year 1946 stand out as the year for the beginning of everlasting peace.

In expressing my sincere wishes for a peaceful and prosperous New Year, I wish to reaffirm the principles and doctrine of the Command and General Staff School as expressed in the motto—Ad Bellum Pace Parati.

L. T. GEROW
Lt. Gen., USA
Commandant

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Operation on the Crozon Peninsula

MAJOR GENERAL D. A. STROH
Commanding General, 106th Infantry Division

IN my old student days at Leavenworth, while chewing the end of my pencil in the usual fog of perplexity on the upper floor of Grant Hall, I used to wonder why the faculty insisted on presenting problems dealing with the independent division. I had come to believe then that such an operation in future war would be extremely unlikely, and that divisions would habitually operate as parts of much larger masses. The war in Europe disclosed the fallacy of such a belief, and the wisdom of instruction in the operations of the independent division. On many occasions units of this size found themselves completely on their own as far as tactical dispositions were concerned. The operations of the 8th Infantry Division on the Crozon Peninsula, Brittany, in September 1944, were an interesting example.

This was one of the few campaigns in my experience for which ample time was afforded for plans, orders, and reconnaisance; when the various troop units moved into position methodically and without interference; which was amply supported with the necessary means; and which worked out almost exactly as originally planned.

The 8th Infantry Division, with normal attachments of medium tanks, tank destroyers, and antiaircraft artillery, arrived in the Brest area on 18 August 1944, relieving elements of the 6th Armored Division which had been containing a large German garrison in that fortress. Thereafter, as part of the VIII Corps (2d, 8th, and 29th Infantry Divisions) the division advanced slowly from the north for the capture of Brest. By 10 September the corps attack had progressed so successfully that the 8th Infantry Division was pinched out by the converging advances of the two divisions on its flanks. The Corps Commander directed that the division make a move of some fifty miles and reduce the German defenses on the Crozon Peninsula commencing on 15 September.

The Crozon Peninsula was estimated to contain from 1,500 to 3,500 German defenders who had the advantage of formidable permanent fortifications and large amounts of artillery. This force had been contained for some weeks by an improvised American unit known as Task Force "A," consisting largely of mechanized cavalry, combat engineers, tank destroyers, light tanks, and armored light artillery. Task Force "A" with commendable aggressiveness had driven west along the peninsula until it held the line

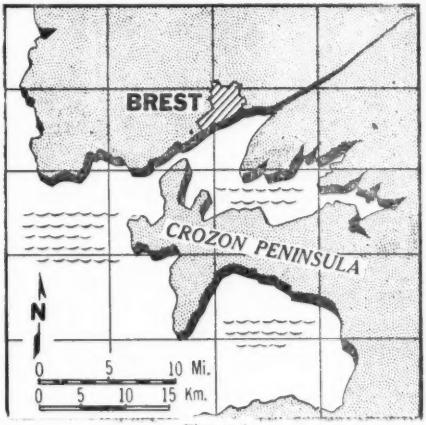


Figure 1.

shown as AA in Figure 2. Beyond this point it had been unable to advance because of strong enemy resistance.

The Crozon Peninsula completely dominates the water approaches to the port of Brest, as is evident from Figure 1. It bristled with seacoast defenses. Until these could be reduced, the use of the port would be completely denied to the Americans even after they were in possession.

The peninsula itself is shaped like a forearm, wrist, and a hand of three fingers and a thumb. The principal town, Crozon, lies at the wrist. The thumb is represented by Ile Longue; and the fingers by Pointe des Espagnols, the Camaret Peninsula, and Cap de la Chèvre.

The forearm and wrist are bisected almost exactly by the Rau de Kerlock, flowing from

east to west. This stream constitutes a definite obstacle to north and south movement north and northwest of Crozon. Another stream of importance in the operation is L'Aber Rau, subject to flooding from the sea for some 2,000 yards inland from its mouth. Paralleling the Rau de Kerlock to the north and south are two distinct ridges, generally covered with the vegetation and hedgerows common to this portion of Brittany. The northern ridge reaches a height of about one hundred meters just west of Kerborel, where a heavily defended airfield was located, and in the vicinity of Crozon. The entire north coast was under observation from Pointe des Espagnols, and the entire southern coast from Cap de la Chèvre, both of which were in German hands. On the other hand, the large hill masses east of the line held by Task Force "A" afforded us excellent observation over the entire peninsula.

Excellent overprinted maps of the known German defenses were available and proved exceedingly accurate. As was to be expected, most of these defenses were sited to fire out to sea. Those along the twin ridges along the forearm and wrist of the peninsula were sited to fire respectively north and south. Those on the thumb and fingers covered all the water approaches to Brest. In addition to the sea coast defenses, however, the Germans had constructed formidable land defenses, generally facing east. Included therein were several old but strong French forts. One of particular interest was situated just northwest of Crozon, and another dominated the narrow approach leading to the Pointe des Espagnols near Quelern. The latter was further strengthened by a high stone wall and redoubts extending entirely across the narrow neck at this point, except for a break near the eastern end, a few yards wide, through which a road passed.

After a complete study of the topography and German defenses it was decided to attack initially with two regiments in assault, each to operate from east to west along one of the forearm ridges, thus taking advantage of the high ground which these ridges afforded, to take the bulk of the German defenses in flank. The flat, wide valley between the ridges would be mopped up by the light elements of Task Force "A," advancing abreast of the assault regiments and maintaining contact between them. The initial attack of the assault regiments was to continue until the westernmost extremities of the parallel ridges had been captured in the vicinity of the wrist. The left (south) assault regiment would then halt and consolidate its positions while Task Force "A" would push to the southwest and clean up the German defenders in the Cap de la Chèvre, where heavy resistance was not expected. Simultaneously the right (north) assault regiment would resume its advance for the capture of the Camaret Peninsula.

Strongest resistance was expected in the Pointe des Espagnols where the most formidable defenses were located, and where the German garrison of the peninsula was expected to retire for its final stand. The reduction of this finger was to be the job of the remaining regiment of the division, kept in reserve for that purpose, and committed when the right assault regiment had closed into the Camaret Peninsula.

As the division was relieved by echelon from in front of Brest it was moved to assembly areas east of the line held by Task Force "A." Task Force "A" itself passed to the control of the division approximately forty-eight hours before the attack started. Other reinforcements were strong and ample, bringing the strength of the division to approximately 25,000 men. Reinforcements included the following:

709th Tank Battalion (medium tanks) (less Companies A and D).

644th Tank Destroyer Battalion (less Company A).

Companies B and D, 86th Chemical Battalion.

445th Antiaircraft Artillery Battalion.

2d Ranger Battalion.

Headquarters and Headquarters Battery, 34th Field Artillery Brigade.

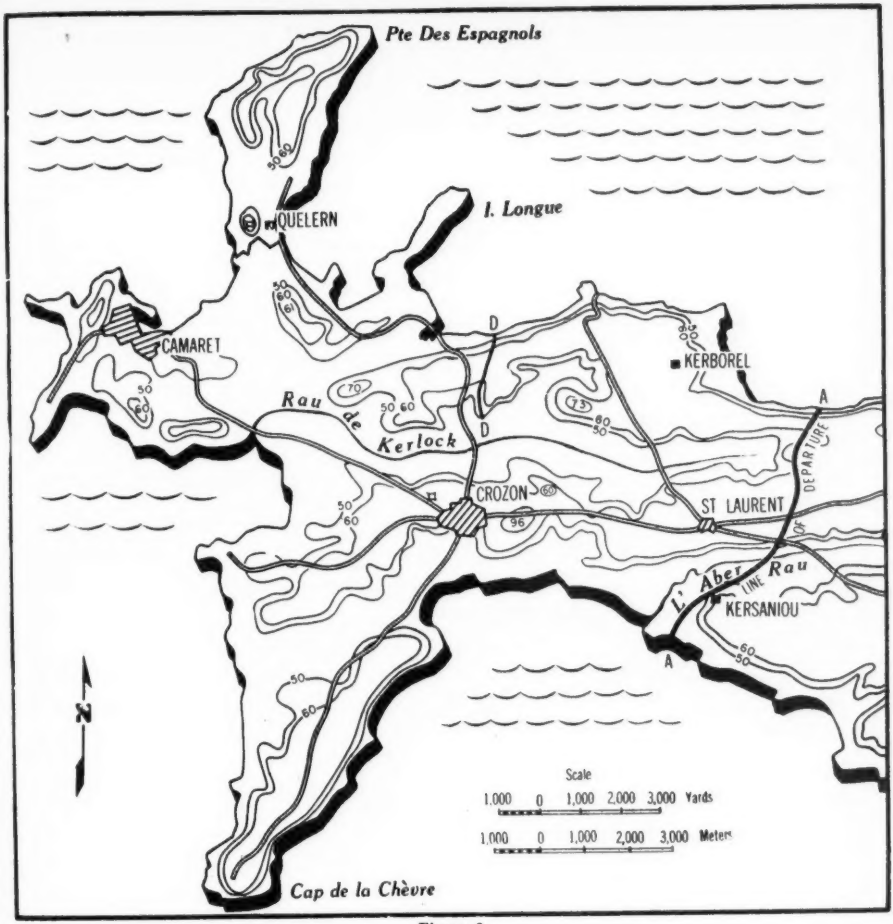


Figure 2.

Headquarters and Headquarters Battery, 402d Field Artillery Group.

265th Field Artillery Battalion (240 howitzers) (less Battery C).

256th Field Artillery Battalion (8-inch guns) (less Battery C).

740th Field Artillery Battalion (8-inch howitzers) (less Battery B).

770th Field Artillery Battalion (4.5-inch guns).

969th Field Artillery Battalion (155 howitzers).

687th Field Artillery Battalion (105 howitzers).

83d Armored Field Artillery Battalion (105 howitzers).

Battery C, 16th Observation Battalion.

All attached medium and heavy artillery operated under the 34th Field Artillery Brigade. All other attached artillery operated directly under Headquarters, Division Artillery. In the latter phases of operation the division also received effective support from American artillery from the Plougastel

Peninsula several thousand yards to the north.

The division was also authorized to call direct on Thunderbolts operated by the aggressive pilots of the 378th Fighter Bomber Squadron, 362d Fighter Group, based at Rennes.

All elements of the reinforced division were in position by 14 September except the 13th Infantry (division reserve), which arrived on the 15th. All plans had been perfected, orders issued, and ground and air reconnaissance completed by dark on the 14th. Task Force "A" had been relieved from its covering position on the night of 13-14 September by one battalion of each of the assault regiments, and assembled in reserve in the vicinity of Argol [approximately four miles east of St. Laurent].

The 28th Infantry, Colonel Merritt E. Olmstead, attacking in the north zone, started its assault at 0800, 15 September. It attacked with the 1st and 3d Battalions, right to left in assault, and the 2d Battalion in reserve. The regiment was reinforced by Company C, 709th Tank Battalion; Company B, 644th Tank Destroyer Battalion; and Company D, 86th Chemical Battalion.

The 121st Infantry, Colonel John R. Jeter, attacking in the south zone, also employed two battalions, the 1st and 2d, in assault. Its 3d Battalion occupied excellent firing positions on the high ground in the vicinity of Kersaniou, from which it supported by fire the attack of the remainder of the regiment. No attempt was made in this portion of the zone to advance because of the difficulty of crossing L'Aber Rau. The regiment was reinforced by Company B, 709th Tank Battalion; Company C, 644th Tank Destroyer Battalion; and (after the 16th) Company A, 86th Chemical Battalion.

The first day's fight was a typical hammer-and-tongs affair through hedgerow country with which the division had become thoroughly acquainted during its operations in Normandy and the attack on Brest. By dark both regiments had advanced on an average of 800 yards against stiffening resistance and believed themselves in contact with the German main line of resistance.

The 28th Infantry renewed the attack at 0700 on 16 September and progressed slowly but steadily throughout the day, registering a gain of about 1,100 yards by dark. The 121st Infantry, renewing the attack at 0800 on the 16th, succeeded during the day in capturing an enemy strongpoint at St. Laurent, and in making an appreciable breach in the hostile main line of resistance in the southern portion of the regimental zone. The Germans reacted vigorously against the 1st Battalion on the right during the afternoon, launching three successive counterattacks, all of which were repulsed. Both regiments were now abreast and in a position to exploit the success the following day.

Progress on 17 September in both regimental zones was rapid. On the right, the 28th Infantry, still attacking with the 1st and 3d Battalions abreast, and aided by an early-morning ground fog, quickly overran the airfield near Kerborel, continued to sweep along the northern ridge, and by dark had seized a position nearly 5,00 yards west of its jump-off in the early hours of the morning. Its 3d Battalion moved forward by bounds in rear of the assault battalions cleaning up bypassed pockets of resistance. The 121st Infantry, likewise without change of formation, made even more rapid progress on this date and by dark had seized its regimental objectives in and around Crozon, an advance of about 7,000 yards during the day.

Task Force "A" was having difficulty keeping contact between the rapidly advancing assault regiments, due primarily to the lack of suitable east and west roads through the valley of the Rau de Kerlock. Most of its vehicles were forced to use the ridge roads in the rear of the assault regiments, sending patrols to the north and south therefrom across the valley. As darkness (1900) approched it was evident that Task Force "A" would be unable to advance beyond the road running north from Crozon, although an advance as far as Hill 70 would have been desirable.

At dark the division was buttoned up with the 121st Infantry disposed with one battalion in the vicinity of the fort northwest of Crozon, one battalion on the high ground about 1,000 yards southwest of the town, and one battalion on Hill 96. The 28th Infantry had the 1st and 3d Battalions abreast along line DD, with its 2d Battalion on Hill 73. Task Force "A" was in contact with the interior flanks of both regiments. The 13th Infantry, still in division reserve, had been moved forward by bounds during the day and was at dark disposed with its leading battalion on Hill 60. The 8th Reconnaissance Troop was ordered from division reserve and attached to the 28th Infantry at 2015 on the 17th, for the purpose of assisting that regiment in its operations of the 18th.

The operations of 17 September had witnessed the complete collapse of the German defenses as far west as the wrist of the Peninsula. The withdrawal had assumed the proportions of a rout. Nearly 1,500 prisoners were captured, including thirty officers. One of these unfortunates had in his possession the German field order for the occupation of new positions during the night 17-18 September, complete with the location of command posts, assembly areas, and lines of resistance. This order was promptly transmitted to the artillery of the division, which proceeded to take full advantage of it during the succeeding hours of darkness. It was a field artilleryman's dream. Guns of all calibers pounded the new German areas mercilessly throughout the night, doubtless adding to their already serious confusion and disorder, and paving the way for a continuation of the American advance on 18 September.

The stage was now set for the beginning of Phase 2 of the operation. Prior to daylight on 18 September one battalion of the 13th Infantry was to advance and seize Hill 70 and protect the advance of the 28th Infantry to the west against interference from the southwest. The 28th Infantry was to continue its advance to the west, seize Hill 61 and continue its attack into the Camaret Peninsula. The 2d Ranger Battalion, attached to the division on 17 September, was to move in rear of the 28th Infantry, swing to the north as soon as uncovered, and reduce the defenses in Ile Longue. The 121st Infantry was to hold its positions in the vicinity of Crozon and to cover the debouchment of Task Force "A" into Cap de la Chèvre.

Operations on 18 September progressed most satisfactorily. Hill 70 was occupied by one battalion 13th Infantry prior to daylight. Under its protection the 28th Infantry swept forward, captured Hill 61, and occupied the entire Camaret Peninsula before dark.

As soon as the 28th Infantry had passed Hill 61 on its way to the west, the 13th Infantry occupied this hill and advanced with the patrols of one battalion as far as the wall across the neck of the Pointe des Espagnols.

The 2d Ranger Battalion had no difficulty in occupying Ile Longue, where it released several hundred American prisoners of war previously captured during the Brest campaign.

It had been planned previously that Task Force "A" would use routes southeast of Crozon in moving into the Cap de la Chèvre. This was found unnecesary due to the feeble hostile reaction and the stout defense maintained by the 121st Infantry on the high ground in the vicinity of the town. All day the numerous mechanized and motorized vehicles of Task Force "A" streamed through Crozon on their way to the southwest. Given elbow room, this highly mobile force rapidly spread out over the entire cape. This proved to be a cavalryman's holiday. By dark, advanced elements of the force had reached the tip of the cape, and gathered in several hundred bewildered German prisoners, including Lieutenant General von Rauche, Commander of the 353d German Division.

This officer had had a busy three months previously. His division had been cut to pieces by the advance of the 9th Infantry Division, whence he had led the remnants to Brest and thence to the Crozon Peninsula, only to be finally hunted down and captured at last.

With the forearm, wrist, thumb, and two of the three fingers of the Peninsula in American hands by dark on 18 September, it remained only to raise the curtain on the last act of the drama on the 19th. It was estimated that reduction of the Pointe des Espagnols would not be child's play. The old but formidable French fort and the wall across the neck were so strong that tentative plans were made to bypass them by a small amphibious operation in which the 2d Ranger Battalion and at least one battalion of the 13th Infantry would participate. Naval landing craft were available but naval authorities would not authorize their use because of the lack of suitable landing beaches along the shore of the Pointe. Numerous small French fishing craft in the vicinity were earmarked for the task if it proved necessary. During the night 18-19 September the bulk of the artillery with the division was moved to the west to be within easy support range of the attack on the following day. Brest had already fallen to the 2d and 29th Infantry Divisions. Arrangements were made with American artillery based on the peninsula north of Crozon to add its weight to the other fires. The 378th Fighter-Bomber Squadron was to participate, with planes in the air at all times. The 13th Infantry, Colonel Robert A. Griffin, fresh and eager, was in position ready for the jump-off in the vicinity of Hill 61. Company B, 709th Tank Battalion, and Company C, 644th Tank Destroyer Battalion, were relieved from attachment to the 121st Infantry and attached to the 13th Infantry on the afternoon of the 18th.

All night, and until 1100 on 19 September, artillery of all calibers battered at the wall and at the fort, but were unable to effect a breach. Accordingly, at that time the 3d and 2d Battalions, 13th Infantry, attacked abreast. These troops, with magnificent elan, scaled the wall, overran the fort, and continued their advance to the north. The men advanced with parade-ground precision following closely behind successive concentrations put down by the overwhelming American artillery and closely supported by the dive-bombers of the Air Force, which strafed and dropped their bombs repeatedly only a few hundred yards ahead of the advancing infantry. Strongpoint after strongpoint fell, and by dark the victorious troops had reached the northern point. The intrepid young pilots of the 378th were still longing for a fight and were disappointed when, at about 1800, they were told that there were no more targets and that the final objective had been reached.

Near the tip of the point, in a dugout seventy-five feet deep, the men of Company I, 13th Infantry, captured Lieutenant General Ramke, surrounded by the last remnants of his 2d Paratroop Division. Ramke had led the German invasion of Crete in 1941, and was the commander of the fortress of Brest before he escaped therefrom by water in the last days of the siege of that city to make a last ditch stand on Crozon.

Crozon Peninsula, consisting of approximately fifty square miles of as heavily organized an area as any that existed in France, had been cleared in five days of a whirlwind campaign. A total of 225 officers, including two lieutenant generals, 895 noncommissioned officers, and 6,316 privates were captured. This number represented more than twice the estimated maximum of German defenders. In addition, some hundreds were killed. Careful planning; time for orders, reconnaissance, and movement; the necessary means to accomplish the job; maximum coordination between artillery and infantry, and between ground and air forces; and finally, the irresistible aggressiveness of the American soldier paid dividends.

On Discipline

GROUP CAPTAIN C. G. LOTT, *Royal Air Force*
Director of Training, Royal Air Force Delegation, U.S.A.

"DISCIPLINE" is a much maligned word. To many it means dull routine coupled by red tape to petty and irritating rules and regulations, which is a very wrong conception. I have heard discipline defined as "a habit of cheerful and willing obedience," but my understanding of the word goes a good deal farther than that.

Taking self-discipline first, it seems to me that the qualities of self-control, self-confidence, and self-respect—bound up with a little pride—are all part of it. A man who possesses these qualities to any reasonable degree also possesses good self-discipline; he is a unit ready in all respects to fit into the bigger patterns of unit and Service discipline. Good leadership, out of which grows self-confidence, is naturally a primary requirement for the discipline of a unit, and when that discipline is inspired by a knowledge of what the individual and the unit is fighting for, it will produce the finest discipline. Cromwell expressed this idea clearly and forcibly when he wrote, "Give me a plain russet-coated captain who knows what he fights for and loves what he knows."

It is upon the commanding officer that the discipline of a unit or formation depends, but it is the duty of every officer and NCO to inculcate good discipline in their men. To do this, they must command their respect and gain their confidence, as well as teach obedience. It is for these reasons that outward symbols such as badges of rank and saluting are necessary, particularly during training. It must be understood that these outward symbols are not discipline in themselves. True discipline is not expressed in the lines "Theirs not to reason why, theirs but to do and die." Nor does it mean that a commander must keep his plans to himself or that his junior officers and NCO's should lack self-reliance or initiative. What it does mean is that the commander has confidence in his juniors and that his juniors have confidence in him. It means that they can rely upon each other. Confidence and discipline cannot exist without efficiency, and it follows that officers, NCO's, and men must spare no effort to make themselves as efficient in the employment of their weapons as they possibly can. Discipline might also be likened to the steel in reinforced concrete, which provides a core of strength to the entire structure. It is more intangible than that, of course; it is an abstract quality like courage and "nerve." "However perfect the machines," writes C. S. Forester in *The Ship*, "war in the last analysis is fought by men whose nerves must remain steady to direct the machines, whose courage must remain high when they as well as their machines are in danger, whose discipline and training must be such that they work together."

It might perhaps be possible to get a better idea of what discipline means by considering one of its opposites. There have been many examples of panic, often in a crowd threatened by danger. One of the most shocking, perhaps, being that which occurred in a London "Underground" railway shelter during a raid when a slip by one person on a stairway started a fearful panic which resulted in scores of people being crushed and trampled to death for no reason whatsoever. A well-disciplined crowd would never have reacted in this way. Disciplined men are calm and steady in emergency and perform their duties purposefully.

I wrote a moment ago about outward symbols in the form of saluting and address, but there are many occasions when regulations must be relaxed. A foxhole, for instance, is no place for standing on ceremony, nor is an airplane in combat, but throughout his training the fighting man must be taught something of the many facets of the disciplinary touchstone. Blind obedience is all very well, but if a man is taught why obedience is necessary and given some of the reasons for well-established military or naval customs, he is more likely to respond nat-

urally to the demands of discipline. I suggest that there is more room for education on discipline and all that it implies. It is anything but easy, as I have discovered by lecturing fighter pilots!

What I tried to make them realize was that, for them, good discipline means punctuality: punctuality on the ground and in the air, at the briefing room, and at rendezvous; good formation flying and mutual support; confidence and cohesion as a team; determination to accomplish the task; compliance with flying regulations, and sound cockpit drill. Added together, these things spell a higher degree of security because the teamwork is better. All this builds up a sense of pride in the squadron, which is good for morale and the reputation of the unit. Discipline makes for efficiency; it will make a poor team good, a good team superb. It provides an intangible bond that strengthens both the individual and the unit.

History can show countless examples of the effect of discipline in war. The story of the Spartans at Thermopylae is, perhaps, one of the most outstanding. In the pass a handful of them held an army of Persians at bay in hand-to-hand combat for an entire day. They fought and died like heroes. Their tough training enabled them to fight skilfully, but it was their iron discipline which kept them fighting to the last man. Remember, they knew what they fought for and loved what they knew.

The Roman Legions, thrusting far out into the unknown world, conquered vast territories with small armies. They employed unique tactics which made the Roman phalanx impregnable and irresistible. They possessed valor and skill in arms together with the discipline necessary to keep formation and cohesion throughout march, battle, and occupation, allowing them not only to defeat much bigger armies, but keep them defeated.

Modern warfare has introduced weapons, vehicles, ships, and aircraft on such a vast scale that it can hardly be compared with the warfare of earlier centuries. The system of communication necessary to provide flexibility of movement and control has also become so complex that opportunity for mistake is enormous. Instant obedience in a fast-moving action is essential for its proper control, and herein lies another requirement for discipline.

The recent war furnished example after example, and it may perhaps be invidious to select one rather than another, but I should like to cite Dunkirk as another example of what discipline can mean to a defeated army. On the beaches of Dunkirk, the troops struggled to board the rescue craft under heavy attack from the enemy. The difficulties were immense and they could hardly be blamed for ditching their arms and equipment as they struggled. But some troops *did* keep their arms, and they stepped ashore on English soil cleanly shaved, with boots and buttons polished, and with their rifles in their hands. These men belonged to a brigade long famous for its rigorous training and discipline. It may appear to be a "line-shoot" and an unnecessary gesture that they should have disembarked in such a fashion, but that is a point of view with which I cannot agree. There is, I feel, something splendid about it. Those men were good soldiers, better soldiers than the others because their discipline was better and their pride more shining. They had fought desperately for weeks and had been rescued amid the greatest difficulties and dangers, but they never lost their pride and discipline. Their display of "Spit and Polish" was the outward sign of an inward discipline.

And there you have it. These so-called petty regulations and irritating rules, these drills and ceremonies—they are outward signs of discipline, yet of themselves they help to teach discipline. The man who abides by them is not necessarily an automaton, but he is one who has learned self-control, and will be one in whom reliance can be placed.

To sum up, I would like to requote Lieutenant General Sir Arthur Smith from the July edition of the MILITARY REVIEW: "Discipline is not an evil burden to be endured but is a noble quality to be achieved."

Tank versus Tank

LIEUTENANT COLONEL ALBIN F. IRZYK
Headquarters, 8th Tank Battalion

"THE American tank is not nearly as good as the German tank." "Next to the German and Russian tanks, the American tanks are the best in the world."

Quotations, opinions, and comments similiar to the two above which have been widely publicized and which have caused widespread discussion have been made by various individuals. Because they have, to a certain degree, jumped to hasty conclusions, and because they have helped fashion many erroneous conceptions, I shall attempt in this article to present considerations which they have apparently overlooked and which may change the outlook of many on American tanks.

In making those statements, what standards did the persons involved use? What were the items and factors that they utilized in making their comparisons?

If they used simply the gun, the weight of the tank, and the width of the track and thereby the flotation of the tank as a criterion, as I am sure they did, then I heartily concur with them that the German Tiger tank is unquestionably superior to the American Sherman tank. The German 88 *is* more powerful than any American tank gun used during the course of most of the war. The German tank *is* much heavier and therefore its armor is much thicker than that of any American tank. The tracks of the former *are* much wider, with perhaps a less vulnerable suspension system than that of the latter. If I stop here, as I am convinced so many have, there is no question but that the German tank is a much better one than our own. In this paragraph there is material, indeed, for sensational headlines in newspapers in the States.

Today, however, let us not stop here. Let us go on! What is the fuel capacity of the German Tiger tank? How long and how far is it able to run on a tank full of gasoline? Does it burn much oil? What is the composition and life of its tracks? How many rounds of ammunition is it able to stow? What is the life (discounting its being hit in action) of a Tiger tank? Is its engine comparatively free of maintenance problems? If maintenance problems occur, are they easy to remedy? How long and how much skill is required to change an engine? Is the German tank able to move for long distances and continuous periods at a steady rate of speed? How is its endurance? Could fifty-three Tiger tanks, for instance, move from the vicinity of Fenetrange, France, in the Saar, to an area near Bastogne, Belgium, a distance of 151 miles, in less than twenty-four hours to answer a fire call as did tanks of the Fourth Armored Division? Could a German Tiger tank be used for weeks of training in England, land in France and fight across the widest part of that country to the German frontier, race back to Belgium, retrace its steps again to the German border, and fight its way well into that country before being replaced? Could the German tank roll for several hours at a speed of twenty-five miles per hour in exploiting a breakthrough?

Did it occur to the critics of the American tank that perhaps questions like those listed above, the answers to which will all heavily favor the American tank, and many others like them should be considered before a decision is reached? Obviously not. I say most emphatically that such factors *must* be included before a thorough, honest, and fair comparison can be made and a sound and intelligent conclusion reached.

In addition to those just cited, items to be remembered, as well, are tactics employed and required respectively by the Germans and Americans, missions involved, and number of tanks on hand for the operations. To create a true picture of the weaknesses and strengths of the tanks being compared, those things take their places in the line of factors necessary to be examined.

On 6 June 1944 and for many days afterward, while the Germans had the Mark V Panther with a 75-mm gun and a Mark VI Tiger with an 88-mm gun, the American

Army was equipped with the M-4A1 tank, or the Sherman, as it is popularly known. It will be unnecessary in this article to list all the specifications of that tank except to say that it weighed approximately thirty tons and had a 75-mm gun. Its tracks were narrow and consisted of three different types: steel, flat rubber and rubber chevron.

During the initial period in Normandy just after the invasion, when engagements were toe-to-toe slugfests, battles with tanks fighting tanks were common. Soon, however, the deadlock broke and American tanks streaked to and through Avranches and hustled across Brittany. Without stopping for breath, the tanks continued on their way across most of France.

In order to keep rolling over hot roads for long, dusty miles for days on end, a light, mobile tank was needed which the terribly extended supply line could adequately furnish with precious gasoline. To withstand the terrific beating the tank was taking hour after hour, it was necessary for it to have a simple yet tough and efficient engine and mechanical system. The fact that the American tanks rolled with but few maintenance problems, and those rapidly attended to by the tank crew alone or by company, battalion, or division maintenance, all of which were close enough behind to repair the vehicle rapidly and send it immediately back into action, testifies to the excellence of the tank. Thus, tank units were still at full tank strength and functioning efficiently when they reached as far east as the Meuse River early in September after moving and fighting consistently day after day from the Normandy peninsula. They stopped then only because they had moved too fast and too far and were forced to wait a few days until their supplies could reach them in large enough quantities to send them ahead again. During that phase of operations, a group of tanks had made a forced march of 258 miles in thirty-eight hours and arrived in good enough shape to have continued on had the situation warranted it.

In discussing tanks, many forget that the tank is *not* a vehicle built primarily to fight other tanks. Rather, its mission above all others is to get into the enemy's rear areas, to disorganize him, to destroy supply and communications, and generally to wreak havoc there. This is done mainly with its 30-caliber machine guns, especially the one mounted co-axially, and with high-explosive fire from the tank cannon. The tank cannon's chief function, however, is to protect the tank while it is disrupting, exploiting, and destroying the enemy. Of course, very, very often a few well placed shots from the tank cannon will be much more effective than the 30-caliber machine guns, and therefore the cannon is used very frequently in offensive action.

The tank served its primary mission gloriously in that dash through France Its opponent was dazed, disorganized, and on the run. Most of his equipment was "thin skinned," and was "duck soup" for our tanks. The 30-caliber fire and 75-mm high-explosive fire, for good measure, was plenty good enough to leave much of the German Army equipment and personnel strewn by the wayside.

A factor rarely considered, yet on occasion vitally important, is the type of bridge that a Sherman can use to cross a stream or river. Many bridges that are adequate for the American tank would pose a knotty problem for the German tank. The bridge would have to be much wider and much stronger, and would require a great deal of time and more facilities to construct. Many bridges intact and able to accommodate the lighter American tank would deny passage to the heavy, lumbering Tiger.

Hardly a critical word was heard concerning the American tank in those days. The reason obviously was that it was plenty good for the task at hand. The tank was accomplishing an ideal tank mission in a superior fashion, and it seemed to have been built for just that kind of job. During the summer and fall of 1944, the Sherman performed to perfection and brought the Allied armies within scent of the German frontier.

It was late in 1944 that the American tank became the target for taunts and criticism. Forgotten quicky were the results it

had gained just a month or two before. In October, November, and December the ground became a sticky morass; the war was stabilized and no great advances were being made. The war was bloody and difficult, slow and discouraging. For every yard wrested from the enemy, tremendous effort had to be exerted.

During this stage of the war, the tanks could not perform as they had earlier. Rather, they were forced to fight tank versus tank. Here the German had a tremendous advantage. He was fighting a defensive warfare. The terrain was admirably suited for him. It was rough, and this enabled him to pick the key terrain features on which to post his men and vehicles. The ground was so muddy that advancing, attacking elements could not maneuver, could not outflank. They had to slug it out toe to toe, face to face. Without a doubt the tank of the Germans was ideally suited for such a fortunate turn in the war for them. The tank could pick dominating ground, and with its huge gun and thick armor proved to be a roving pillbox par excellence. On many occasions it picked off American tanks as they floundered in the mud in an effort to gain valuable ground and dislodge their adversary. It was during those trying days that many an American tanker and those that observed him began to lose faith in the Sherman. The tanker was forced to move very slowly because of the muck, and very, very often he spotted a German tank, fired first, and scored a hit only to see his 75-mm shot glance off the enemy tank causing absolutely no damage to it. The 75-mm gun proved to be comparatively ineffective during this chapter of the war. At 1,000 yards to 1,500 yards it could be effective, and a single tank has knocked out five Panther tanks with six shots. Yet to get that close to a German tank made the Sherman vulnerable indeed. Many tanks were lost in endeavoring to get in close, which was necessary in order for them to strike a telling blow. The absence of an effective armor-piercing shell proved to be a terrific handicap, as well. Thus, during that siege, the American tank was impotent when running into the German tank head-on. As a result, many a Sherman was lost even after it had shot first and scored the first hit. That was when the seeds of dissatisfaction in the American tank were sown and when much faith was lost.

It must be remembered that the German tank had everything its way. It was fighting a defensive game, the terrain was in its favor, and the wet ground played into its hands.

Still, it must not be forgotten that though the cards were stacked against the American tank, it defeated the enemy and gained the desired ground. Though the Shermans were easily bested tank for tank, they could always bank on a numerical superiority, which fact was considered in tactics and strategy employed. By banding together and maneuvering, they were able to dislodge and knock out the heavier German tank. Even during those days, one German tank knocked out for one American tank was a poor score. It was in most cases three to one, four to one, and five to one in favor of our side.

One must not forget that the German requirements and our own were totally different. They were fighting a slow war, a defensive war where they picked their spots. They had fewer tanks than we, so their tactics, of necessity, had to be different. We were fighting an offensive war, we were hurrying to get it over with, we wanted to shake loose, and we had many tanks with which to do it. Virtually never did a scrap take place with fifty German tanks against fifty American or twenty against twenty. The proportion was usually five American to one German, even ten to one, rarely if ever less than two to one. So it must be made clear to anyone comparing the tanks of the two nations that, as I said before, throughout the campaigns the requirements and needs were different. We could not use nor did we want a lumbering, heavy, mobile pillbox type of tank, and we could not have done what we did if we were so equipped. Then again we had numbers upon which to fall back, and we considered that in our tactics. Mechanically we had a tank that performed superbly, and after

groaning and grunting through heavy, sticky mud for weeks on end, it still was running at the end of this phase.

There is no denying that in those hectic days a tank such as our newest Sherman with a wider track and a more potent gun would have saved many American lives and tanks and would have knocked out more enemy tanks, and more quickly, too. During that period, and that period alone, was the American tank discredited, criticized, and found lacking. The situation was hastily remedied, but for many it was a little late.

The closing days of 1944 and the early part of 1945 found a new type Sherman joining the ranks of American tanks and replacing its tired brothers. Although it has no additional armor and weighs but a ton or two more, it arrived on the scene with a potent, long-tubed 76-mm gun with muzzle brake and high muzzle velocity that makes it effective at much longer ranges than the 75-mm. As a result, it is not necessary for the new tank to get as close in as the old tank before becoming effective. A new type, high-velocity, armor-piercing shell was added for the gun and gives it far greater penetrating qualities.

The new tank has an engine with a higher horsepower which, in addition to an increase in power, makes it capable of higher speeds. Its track is much wider and has a new type track suspension system which gives it more stability and cross-country mobility with which to combat adverse ground conditions. The tank has the traditional endurance of American tanks and rolls consistently for endless miles. It goes ninety miles and often more on a tankful of gasoline.

The tank is characteristically simple, as such equipment goes, and the tank crew alone is able to maintain its vehicle for long periods. New men in tank crews catch on to their jobs quickly, which is one important factor in making our tank crews superior to those of the Germans and explains why our armor operated most of the time at top-notch efficiency. One last advantage, though minor in discussion, was extremely valuable to the tank crew—the turret with two hatches. Also, the new Sherman, like the old, had the potent 50-caliber antiaircraft gun which proved so effective against enemy planes and which played havoc with dug-in Germans.

All in all, the new type Sherman is a marvelous tank. It answered the prayers of the tankers and was on hand to drop the curtain on one of the dirtiest and hardest phases of the European war. It was the new tank with all the advantages of the old one and many new qualities that did the racing in Germany, Austria, and Czechoslovakia, and finished the war in a blaze of glory. Mounted in that tank, no American tanker was afraid to take on any tank that faced him. If only the new type tank could have been produced and brought to the front lines sooner!

German tanks, on the other hand, are not what they are cracked up to be. Their heavy armor was a hindrance rather than an asset. The tanks could not carry on the same kind of offensive warfare that our tanks did. With their heavy armor and complicated mechanism they were tank destroyers and not tanks.

Even though the German tanks were much heavier and thicker than ours, their armor was centralized. Most of it was on the front slope plate and turret. Sides and rear were often vunerable, and how we capitalized on that!

The armor on German tanks was generally poor. It often cracked on impact, leaving ragged, gaping holes, whereas the holes in our tanks were clean, circular, and easily repairable.

The Germans developed a gun with a high muzzle velocity and an effective armor-piercing projectile. To do this they sacrificed space in the tank, for they had to increase the size of the shell and thus could not stow many rounds.

It must be mentioned that once again the Germans lost sight of the purpose and function of a tank and thought primarily of destroying other tanks. Still, though our muzzle velocity was less than theirs, our high-explosive fire was just as effective. Of the two, the high-explosive fire was for us the more important consideration.

Mechanical advantages of the German tank over our own were few. The interiors of their tanks were not nearly as well equipped as ours, and it took altogether too much maintenance to keep a German tank rolling.

Still another item often overlooked is that it was necessary for us to carry an adequate basic load of ammunition and gasoline in our tanks, for to replace what we used we had to call upon trucks that had to travel over a long, dangerous supply route. The Germans, on the other hand, sat close in many of their defensive positions to their ammunition and other supply. It might astonish some to know that prisoners of war claimed that some of their large tanks had a running time of a mere two and a half hours on a full vehicular load of gasoline. Thus, the tanks did not have the endurance nor the cruising ranges of our tanks. Therefore, in many instances they had to be transported by rail virtually to the front lines, unloaded, and put into the battle. How far could we have gone with our tanks if we had had to follow a procedure like that?

Not yet mentioned is the power traverse with which American tanks are equipped. It is one of the very important reasons why so many of our tanks bested the German tanks. Of course, it may have been that our gunners and car commanders were superior to the Germans, and that the excellence of our tankers provided us with the upper hand. We agree to that, yet it is felt that of inestimable advantage to our tankers was the distinct handicap under which the German tankers labored because of a lack of a 360° power traverse comparable to ours. Because of that important disadvantage, they were slow firing and in many cases got off one round to our three or four. Instances have occurred where a Tiger tank lay hidden, waited in ambush, and fired the first shot at advancing American tanks and missed! The mistake was fatal, for American tanks maneuvered about it and with their rapid fire destroyed the German tank.

By means of the 360° power turret traverse with which all our tanks are equipped, a tank gunner is able to swing his gun in any direction in a second or a fraction thereof. The average American tank gunner can lay on a German tank, is able to get the first round off, and can usually score the first hit. The power traverse enabled American tanks to move down roads at high speeds shooting from one side of the road to the other. In this manner enemy infantrymen and bazooka teams were killed or pinned down as the tanks rolled by. The power traverse has been such an advantage and of so much importance that it is immeasurable.

At the moment, virtually every tank battalion is nearly completely equipped with the new type Sherman tank technically called the M4A3-E8. Of all the tanks operating today, that one, in my estimation, is the best there is. I would choose it above all others. Many, many experienced combat tankers feel exactly as I do. The tank will go faster and will live longer than the German Tiger. The Sherman burns less gas and oil and as a result is able to go much farther on a tank full of gasoline. Its maintenance problems are few and far between and are easily remedied. It is an easy matter to change an engine, which takes little more than four hours and which beats all hollow the best time for the Germans. It has a good gun, and good ammunition for it. It does not take much to tow one of our tanks that is disabled, but a huge vehicle is required for the German Tiger, and often German tanks had to be abandoned because huge vehicles were not available. Yes, considering all factors, I believe that even the most prejudiced or the one most difficult to convince will nod toward the Sherman.

The Sherman must give ground to the Tiger when the size of the gun and the thickness of armor is considered. The tanker knows and takes for granted that if his tank is hit by an 88 it will be penetrated. He also knows that the addition of a few tons of armor will not stop an 88. He respects, and always will, the German gun and the thick armor, but he will never swap his tank for those advantages. To build a tank that would stop an 88 shell would be to lose a tank and gain a lum-

bering steel pillbox with no mobility left. It has been said, practically speaking, that the only thing that will stop an 88 is "Cease fire." Similarly, to stop our 76 with high-velocity armor-piercing ammunition, the enemy will need a mighty heavy tank, indeed.

Once again, let us not forget that the Americans fought an offensive, fast, deceptive, and *winning* war. We crushed our adversary; therefore the tanks which spearheaded the victories must have been good. Tank for tank, toe to toe, we were outclassed. But that was not our way of fighting. For the person still not convinced I suggest that he tabulate the count of American tanks knocked out by German tanks and vice versa, and I am sure that he will discover, perhaps to his amazement, that the scale will swing heavily in our favor.

Not long before the curtain dropped on hostilities in Europe, the American General Pershing tank made its bow. It has a 90-mm gun, weighs forty-six tons, has a different suspension system, and has a low silhouette. It is said that here is a tank that incorporates all the advantages of the Sherman tank and with its new additions makes it superior to the German Tiger in *every* respect. As far as my personal knowledge goes, I must reserve my opinion until later, for that tank is comparatively untried.

I will say to the persons that have so glibly sold our tank down the river that there is more to it than meets the eye.

War Dogs

From an article in *Army and Navy Register.*

THE Army is setting up a peacetime program to breed war dogs as it does horses, at the same time cancelling its request for donations of dogs.

Under the new program, the Army will place breeding dogs with civilian breeders and select the puppies best suited for military needs.

The dogs will be used as sentries in occupation armies for experiments in developing new uses for dogs in war.

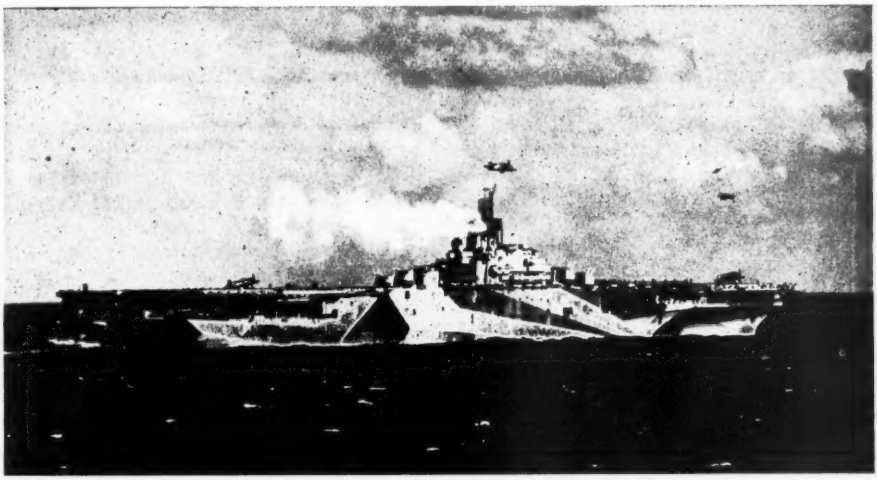
Under the discontinued program over 18,000 dogs were donated to the Army between July 1942 and 15 August 1945. Of this total, 10,206 were trained and issued for active duty with the Army and, earlier in the program, with Coast Guard and Marine Corps. The greatest number of dogs were trained as sentry dogs, although some dogs were trained as scout, sledge, and messenger dogs. A number of dogs were also trained for mine-detection work, although this was an experiment never placed into actual practice.

Of the 18,372 dogs donated to the Army, 7,525 have been returned to their owners, 389 were sold to new owners (offers for their return first having been declined by original owners), 710 were retained by the Coast Guard, and 1,939 are still on active duty with various Army units. The remainder of the 18,372 were reported missing or had died in service.

Aircraft Carrier Tactics

CAPTAIN M. R. BROWNING, *United States Navy*
Instructor, Command and General Staff School

ON 7 December 1941, when Japan struck at Pearl Harbor, the aircraft carrier, as a type of combatant fleet vessel, was a scant twenty years old. The first vessels ever to be converted into carriers were still in service in the fleets of the various naval powers. The USS *Ranger*, the first American warship to have been designed and built from the keel up as a carrier, had been completed only seven years before. The aircraft carrier was—and still is—in its infancy; yet, in the brief period that the type has existed, its prime military characteristics and the essential tactical principles of its wartime employment have been sharply and thoroughly delineated.



The USS Ticonderoga, a carrier of the Essex class.

The roots of the type tactics of any class of man-of-war may always be deduced in large part from the physical characteristics of the ships themselves. Conversely, the prime features of size, armament, speed, etc., of any ship are dictated, in the main, by the tactics of the type to which she belongs. As in the old question of the chicken versus the egg, it is not possible to say which came first—the ship or the tactics; the best we can do is to recognize the fact that the two developed side by side and each contributed to the growth of the other. The carrier is no exception to this rule, but she and her tactics have, in a few years, bridged a span of evolution which it required centuries for her battleship and cruiser cousins to negotiate. Today, she exhibits a maturity of feature and a precision in operation which entitle her to her eminence in naval warfare as co-regent with the battleship.

The amazing swiftness of the carrier's development has been due, mainly, to her unique military features. Unlike any other combatant ship, she does not rely directly upon guns, torpedoes, and depth charges to inflict damage upon the enemy; she uses airplanes. These give her an effective fire range much greater than that of any other type. The last thing any carrier wants to do is actually to see her opponent; her blows are struck far beyond the horizon and long be-

fore conventional gunfire can come into play. On the defensive side, she is the most sensitive to damage of all the major fleet types; for this reason, extraordinary measures must be taken at all times to prevent her being hit. With these two salient characteristics of the type in mind, i.e., that her striking power lies in her airplanes, and that she is hypersensitive to damage, we are in a position to understand her tactics.

The paramount consideration affecting the employment of fleet carriers is the fact that they are, above all, offensive weapons. They are designed to strike with their aircraft, and the ships, themselves, exist for the sole purpose of operating those aircraft. Implicit in this premise is the further one that the ships must be so handled as best to exploit the potential of their air groups; in other words, their tactics must be those which guarantee maximum efficiency in mass aircraft operation in the presence of the peculiar conditions under which they must work. The degree to which this basic precept controls and limits carrier forces is seldom realized by the uninitiated. To those who *do* comprehend its full impact, it not only points the way clearly to sound maneuver of friendly forces, but also indicates with amazing frequency and accuracy just what to look for from the enemy.

Everyone knows that, as a general rule, carriers, to launch or recover planes, must steam into the wind. Further, most people realize that no appreciable cross-wind component is tolerable in these operations because of the extremely narrow runway offered by the ship's deck. Thus, the ship is restricted during air operations, not only to a course generally upwind, but also to a course within very narrow limits, unless the wind be light. In the matter of ship's speed, there are restrictions, also, but the latitude of the choice is much wider. It is imperative that the speed be high enough so that the combined relative wind resulting from ship motion and the true surface air flow shall be enough to render the available deck run adequate for take-off or landing, as the case may be. Normally, this is the only speed condition to be met. All modern carriers except the escort type—the so-called "baby flat-tops"—are capable of making high enough speed to meet this requirement in a flat calm, so that their air groups will not be immobilized thereby. As a general thumb rule, so long as the relative wind over the deck is not *less* than the required minimum, higher values resulting from strong surface winds or high ship speeds, or both, do not seriously inhibit air operation. Under high surface wind conditions approaching gale force, there is a minimum limit below which the ship's speed cannot be dropped without "losing steerageway" and becoming uncontrollable.

Having seen just how surface wind conditions affect ship handling in carrier operations, we may now discern the impact of that factor in actions at sea. Figure 1 illustrates its bearing upon the development of the Battle of Santa Cruz in the South Pacific, in late October 1942. At that time, Guadalcanal was being hotly contested and the foothold of our marine division on the island was precarious. The Jap fleet based at Truk was heavily superior to our naval forces in the area. We knew that the enemy planned a steam-roller assault to be covered by his combatant fleet moving south through the waters east of the Solomons. He had at least four carriers available. To meet this thrust, we were compelled to rely on a task force built around the carriers *Enterprise* and *Hornet* (the first *Hornet*), which force was on its way down from Pearl Harbor. Referring to the figure, this force, on the night of 24-25 October, had not entered the area shown as yet, but was still some distance to the eastward and proceeding southwest at high speed toward our base at Espiritu Santo. On that night, land-based search planes located a large Japanese fleet, containing a number of carriers, steaming south and, at the time, in approximate position marked "J." The *Enterprise* force was immediately ordered to proceed to intercept and attack the enemy fleet. The force

accordingly turned to the northwest, reaching approximate position "A" at 0600 on the 25th. During the night of the 24th, contact was lost with the enemy and was not effectively regained throughout all the next day and night—the 25-26th. Throughout the 25th, our carrier force steamed at top speed, making every effort to close the estimated Jap position; but light surface winds from the southeast retarded them as the figure shows. They were, of course, compelled to launch search flights to locate the enemy as soon as possible, and to maintain strong air patrols over themselves all during the day. Every such operation necessitated reversing course to the southeast and steaming at high speed directly away from their objective. As a result, in the fourteen hours of daylight, they made good only about 170 miles on the desired course, instead of the 400 which a northwesterly wind would have made possible. As a matter of interest, the Jap fleet did not capitalize on our retarded interception, but maneuvered in the area without continuing the southerly drive. The day following the operations shown in the figure, the main action took place; we lost the *Hornet* and the destroyer *Porter*, and the Jap fleet suffered heavy damage and retired to Truk. Guadalcanal was given a breathing spell.

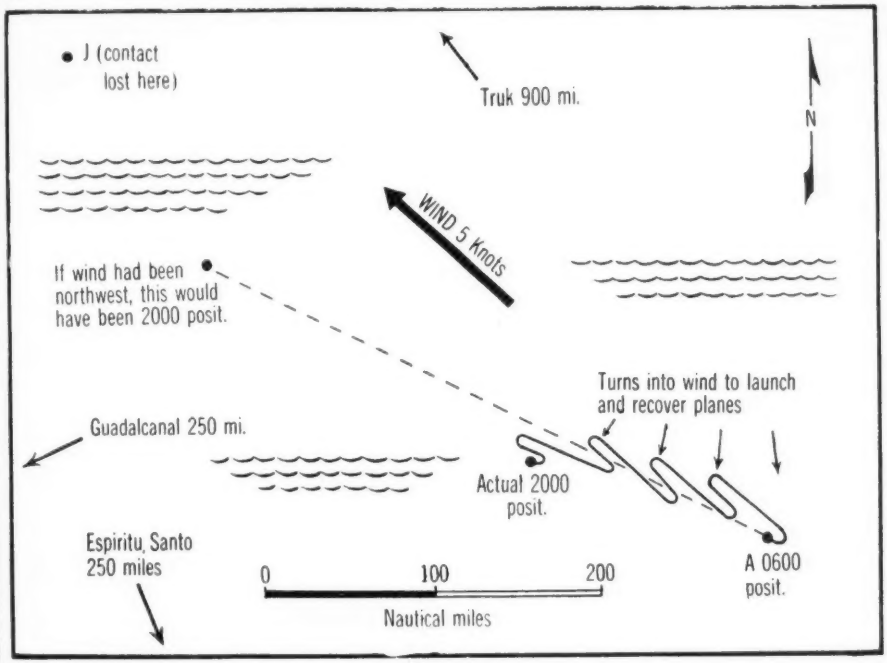


Figure 1.

A similar example of the effect of unfavorable wind occurred in the first raid of the war on Marcus Island. This was carried out by a force of four heavy cruisers and the *Enterprise* in early March 1942. The raid was a bold move at the time, for we were risking precious ships several thousand miles inside Jap-held waters; if any of them were damaged, they had small chance of getting back. After delivering the carrier air strike on Marcus, the force wanted to "get

out" as fast as possible. Unfortunately, the surface wind, which was extremely light, was blowing directly from Marcus Island, so that every launching and recovery during the day required a turn back toward the enemy. After some ten hours steaming at thirty knots, the force had made good only one hundred nautical miles along the retirement course.

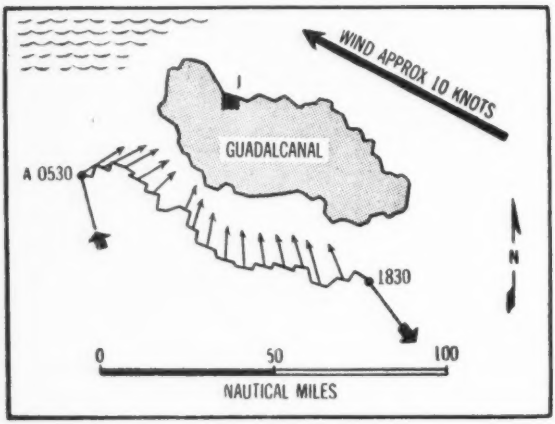


Figure 2.

Examples such as the two cited above do not tell all the story of the effect of surface wind on carrier tactics. Another aspect is well illustrated in Figures 2 and 3. Here, in Figure 2, is a rough sketch of the track of the carrier force which supported our original landing on Guadalcanal. The objective was the beach on the north coast of the island, marked "J" in the figure. Light southeasterly winds were normal in the area at that time of year, and the carrier force planned accordingly. They commenced D-day operations from their daylight position at "A," and continued throughout the day, working along the arc of a radius of about sixty miles from the objective—an optimum selection for continuous strikes at maximum strength level. Not only did the correct selection of initial point "A" permit maximum sustained effort throughout the day, but it also insured that the force was constantly "changing its water," i.e., was not steaming back and forth over the same track or in one small area. Such tactics as these latter are a cordial invitation to enemy submarine attack; to avoid them is a prime concern in carrier work. The point is clearly illustrated by comparing the tracks shown in Figures 2 and 3. The latter outlines the operations of another carrier force supporting Guadalcanal ground troops a short time later. Wind conditions were about the same in both cases, but the initial point "A" in Figure 3 was such that, in order to remain at the optimum distance from the target, the force was compelled to steam back and forth within a small rectangle of sea. On this occasion, fate was kind and no ships were caught by submarine attack. Not long after the operation shown, however, one of the carriers involved was torpedoed and sunk while operating in a similar closed pattern.

So far, we have been discussing the carrier primarily as a member of task forces in which her type has made up the main offensive strength. Such forces dominated the naval scene in the western Pacific in the recent war, due, largely, to the extremely wide-flung perimeter of the Japanse positions and the cumulative attrition in battle strength which had reduced the enemy battleline to a shadow of its normal strength. To assume, as a result, that major battleline engagements are obsolete would be a gross error. The relatively formal, large-scale, fleet action in the open sea remains—and always will—the real crucible of tactics. While the fleet's carriers, in such an action, constitute an important element in the striking power of the assembled fleet, they do not comprise the main part of that power. Just as in the relationship between air and ground in war-

fare ashore, the role of the fleet's air force is one of support of the effort of the whole coordinated fleet. Frequently, and again as on land, the air component "carries the ball" during certain phases of any given campaign, but decisive and final victory comes, normally, only as a result of face-to-face encounter. Ashore, it is the infantry and armor which bear the brunt of this ultimate combat; at sea, it is the battleline —the battleship—which does so.

The carriers of a fleet in action constitute the organic tactical air force of that fleet. The carrier decks are the advanced landing fields. They are located as close to the front lines —the battleline—as they can be and still avoid coming under enemy artillery fire. Accordingly, they will normally be found operating "in the lee" of the battleline and anywhere from five to fifty miles back of it, depending upon the wind and the overall tactical situation. Their first task is to gain control of the air in the battle area; to this end, fleet actions may normally be expected to open with a violent all-out air duel between the opposing carrier components. The objective is to destroy the enemy floating landing fields and thus wreck his air force. This conflict will continue until one or the other has achieved decisive superiority. Thereafter, air attacks by the successful air force will be concentrated upon the surface ships of the enemy battleline and flank forces, in support of the main gun action. As between opposing fleets of approximately equal strength at the outset, if the air force of one has been decisively defeated before the battlelines have engaged, that fleet would endeavor to withdraw unless extreme emergency forbade. That fleet which had secured a measurable degree of control of the air, on the other hand, would press forward with its heavy surface ships to close and destroy the enemy battleline and thus clinch complete victory. Under such circumstances, the battle would be a pursuit in which the air's role would be to slow the enemy withdrawal by damage to his ships and by enforced maneuver on their part to evade air attacks. If, however, no decisive outcome to the opening carrier duel has become apparent by the time the battlelines first reach firing ranges, that fleet whose air may appear to be gaining would normally endeavor to delay the final development of the surface action, in hope of achieving a greater measure of air superiority with its attendant valuable contribution to the final action.

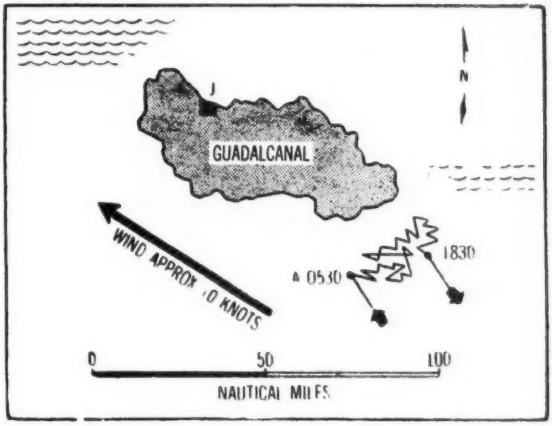


Figure 3.

It is clearly evident from what has been said that, while the carrier is an offensive weapon in essence, she is, nevertheless, operated with extraordinary caution in so far as exposing her to damage is concerned. She is extremely vulnerable. The ship is more than merely a floating landing field. She is a complete military air base, including all maintenance and servicing facilities, operating controls, air-warning and defense systems, etc. She carries in herself all the magazines and ammunition dumps, the hangars

and shops, barracks and mess halls, which feature such a base ashore; but she is unable to disperse either these installations or her aircraft. Thus, she is a compressed assemblage of all the vital, and of all the most vulnerable, instrumentalities of military aircraft operation. Inescapably, she is one of the most delicate pieces of equipment which modern warfare employs. By this it is not meant to imply that carriers cannot absorb punishment and still live; we have had a dozen recent examples in the Pacific of their salvage after terrific beating. What is meant is that the carrier which is damaged is no longer able to function effectively. In the parlance of the boxing ring, she "can't take a punch"; she has a glass jaw. She is fully aware of her own weakness in this respect, and she tries constantly to keep her opponent at long range where her advantage in reach permits her to land effective blows. In-fighting—i.e., any slugging with guns and torpedoes—is disastrous to her. She lives only so long as she abides by the old rule of "he who fights and runs away, will live to fight another day."

A fundamental principle of carrier tactics stems directly and obviously from this extraordinary vulnerability; a carrier is *never* voluntarily placed within gun or torpedo range of any enemy surface ship. There are no exceptions to this rule. It constitutes the key to the self-defensive aspect of the tactics of the type, and it permeates the handling of the ships when on offensive missions. Pursuant to its dictates, carriers are always found surrounded by strong protective screens. They never operate without antisubmarine screens of destroyers and, usually, aircraft. Only when beyond range of possible enemy air attack will they be found without combat patrols overhead. If there is any chance that they may encounter hostile surface warships, they must be screened by surface vessels in sufficient strength to drive the enemy off. This latter requisite almost invariably involves the necessity for cruisers and battleships in the screen; it is the compelling reason why our famous Task Forces 38 and 58, in the last eighteen months of the war, always comprised heavy battleship and cruiser forces surrounding the carriers in the center. Without these heavy escorts, our carriers would have been courting disaster on every raid until the last enemy cruiser and battleship was *known* to have been sunk. Two outstanding examples of the consequences of surface contact between inadequately screened carriers and heavy enemy surface ships featured World War II. The first of these took place off Narvik, Norway, in June 1940. Here, HMS *Glorious*, with a light destroyer escort, was caught and sunk in a matter of moments by the German battleships *Scharnhorst* and *Gneisenau*. The second instance occurred off Leyte in October 1944, when an American escort carrier force—again, with only light destroyer screen—was surprised in the early morning by Japanese battleships and cruisers. In this engagement, poor Japanese tactics and even worse gunnery permitted us to escape with the loss of only two of the carriers and the escort.

We have been looking at the highlights in the life story of the modern fleet carrier —what she is and how she works. It may be condensed into a few words. The ships are the floating air force of the fleet. The aircraft in them are, in their nature, essentially tactical air force types, but the tremendous radius of action and mobility of the ships, themselves, permit of their employment as strategic air power to reach thousands of miles inside enemy lines. In carrier task force raids, their employment partakes of the nature of strategic attack; when they are supporting the fleet in action, or an expedition in an amphibious landing, they are operating as tactical air. No matter what the nature of their employment, however, they are vitally affected by the surface wind direction and strength, and by their own hypersensitivity to damage. They are basically offensive weapons; to exploit their striking power to the maximum, their tactics must include correct selection of operating area, relative to their objective, to

permit optimum mass operation of their air groups to and from the target. At the same time, their vulnerability demands that they be kept aloof from enemy fire of any kind, particularly surface gunfire. To insure that this is done as far as is possible consistent with the mission in hand, they must operate in those areas where enemy units are least likely to locate and strike them; in addition, they must be screened against any and all forms of attack. Their offensive power lies in their aircraft. Their defensive capacity consists of the screens which surround and cover them, their constant and rapid movement through the water, and the extremely powerful antiaircraft batteries with which each carrier is equipped.

Atoms, Russians, and Mountbatten

From a British source.

IN the excitement of the atomic destruction of two Japanese cities and the entry of powerful Russian forces into Manchuria, another factor was overlooked in the assessment of causes leading to the Japanese surrender.

This factor was the carefully planned and potentially formidable invasion of Malaya and the subsequent follow-through to the South China Sea which was only halted by the sudden acceptance of the Potsdam Declaration.

Because of this excitement it is not generally known that a huge amphibious force had been assembled and was ready to carry out, at a moment's notice, what would have been the biggest single operation since D-day in Europe.

There is no doubt the Japanese High Command were acquainted with this great drive and that their decision to sue for peace was influenced by it, for they have had plenty of experience of previous hammer blows from Admiral Mountbatten's Southeast Asia Command in the past.

During the last two years the British-Indian Fourteenth and lately the Twelfth Armies have defeated the largest and most experienced Japanese force ever assembled on one battlefront. These two armies have a record of three smashed Japanese armies and have wrecked and annihilated what was left of ten Japanese divisions. It is estimated they inflicted over 300,000 casualties, including 128,000 counted dead and 3,000 prisoners. In one year they liberated an area one-third greater than the entire British Isles.

By far their greatest task in the future will be to dispose of the estimated three-quarters of a million armed Japanese left in the theater and to clear up the mess the would-be Japanese conquerers left behind them.

It is always the greater number who defeat the smaller. . . . When, with smaller forces, I was in the presence of a great army, I rapidly grouped my own and fell like lightning on one of the wings, which I destroyed. I then took advantage of the disorder which such a maneuver always causes in the enemy's ranks to attack him at another point, always with all my forces. I defeated him thus piecemeal, and the resulting victory was always, as you see, a triumph of the greater number over the smaller.

—Napoleon

The Cogs in the Logistical Wheel

CAPTAIN W. C. BURNS, *Infantry*
Instructor, Command and General Staff School

While this article covers staff operations and technique at a lower level than that taught at the Command and General Staff School, it shows the importance of having general staff-minded officers in field command positions when possible down to and including infantry battalions.

In the action related below, the staff had been used in a haphazard manner up to the time when the new commander assumed command and placed the staff on its normal functional basis. The following is quoted from the "Infantry Combat Series" relative to this commander: "This officer, who was later killed in Italy by an enemy mine, was an outstanding leader and tactician. Considering the number of actions in which his battalion was engaged, it suffered remarkably few casualties under his command."—THE AUTHOR.

SO often we are all concerned with logistical plans at division or higher level that the functional cogs in the logistical wheel are eclipsed by the enormity of such large-scale planning. We are concerned mainly at divisional level with the five principal duties of the Assistant Chief of Staff, G-4, who (1) is the adviser to the commander on all administrative matters (other than those delegated to G-1), (2) initiates and prepares estimates of the supply and evacuation situation, (3) coordinates the preparation of the administrative plan, (4) publishes the necessary orders announcing the plan when approved by the commander, and (5) supervises the execution of the plan when the order has been issued. It is in connection with this last duty of G-4—the execution of the plan—that most of us lose track of the officers at lower levels who find themselves delegated by their commanders with the authority to make decisions to carry out their own unit's responsibility in the successful operation of the overall plan.

Let us take a practical example of how these men who do the "pick and shovel" work, as it has been called, perform. In so doing, let us see how the general staff principles taught at the Command and General Staff School for divisions and higher echelons can, and will, work at the lowest echelon of an "S staff," that of an infantry battalion, particularly when the commander of that battalion is a confirmed believer in such principles and has indoctrinated them into his staff in "Little Leavenworth" lectures during lulls in combat.

Consider this situation. The regiment, of which this battalion is a part, lost contact with the enemy several days ago after a heated local action, and has been occupying defensive positions pending orders to continue the advance. As the position is more or less a bivouac with strong local security, company kitchens are in the vicinity of the company bivouacs and the preparation of a hot supper to be served at 1700 has been arranged. Around the battalion command post, the commander and most of his staff are reviewing the actions of the past few days and are anticipating another quiet night in bivouac after a good hot supper.

At 1530 from a darkening sky a slight drizzle starts to fall—the first of the famed Italian fall and winter rains. Simultaneously, the telephone rings and the battalion commander is summoned. While still on the phone he holds up the conversation for a moment, calls out to the S-3, and tells him to assemble the staff and all company commanders at once for urgent operations and to alert the command to be ready to move. Things begin to hum around the command post, everyone sensing the impending rush by the commander's tone.

When the commander rings off, he hastily addresses the few officers who are then present. "Gentlemen, we have to accomplish the impossible in the next ninety minutes. This battalion has to move by motor, clearing this area by 1700. We are to form into motorized

company combat teams and move up about twenty-five miles tonight to occupy certain key terrain features to screen a road in order that the 'X' Division can pass down this road without delay and move into position between our division and Division 'A,' which is up ahead on our left, and in so doing form a three-division front for future operations. We have to get on the road and clear this area by 1700 because the head of Division 'X,' which is moving by motor, will reach here at that time. A company of tanks has been ordered here to join us, as have two platoons of the antitank company. The regimental commander, who was just on the phone, is on his way here now to issue his order. I'll have to figure out the attachments to the companies and issue my order after he gives his. Gentlemen, this is the most impossible situation I have encountered, but this battalion can and will get out of here by 1700.

"S-4, S-3, and Transportation Officer, you are the men who will have to get this battalion going. Issue orders in my name. Here is my general plan:

"Transportation Officer, the Regimental S-4 is arranging for trucks to be sent here to motorize the battalion. They'll be coming in any minute in small groups from different units with no more knowledge of what's going on than we have. It's up to you to grab them and farm them out to companies and get them into positions near the companies so they can load up and move out hurriedly. You'll have to grab the tank company and the antitank platoons and hold them on the road so we can shuffle and tack elements of these to the rear of each company as it moves out. Organic transportation is still under battalion control. Get it ready to move so that I can attach elements of the weapons company to various rifle companies. Make decisions and issue orders as necessary (in my name). Coordinate closely with S-3.

"S-4, see that the troops get fed their hot meal and ready to move. Make sure that the men have sufficient ammunition and that each has two-thirds of a 'K' ration. Battalion ammunition section moves with battalion transportation column under command of Transportation Officer. You two coordinate as usual."

Including the verbal instructions to S-3 this general plan of the commander to alert the command took about six or seven minutes to issue. The words are not exactly his but the ideas conveyed are a very good replica, probably not as well stated but just as concise and all-inclusive. They were the substance of his rapid estimate of the situation based entirely on a warning order received over the telephone in haste, and his ultimate general plan for placing his command in a state of extreme flexibility in order that it might be able to move in any formation at a moment's notice after he formulated his final plan.

At this point, the commander's extra time spent in training this once very uninformed and inexperienced staff in staff principles and actions began to pay off. The key men needed to get the command in a state of flexibility at the moment were the logistical members of the staff, the S-4 and the Transportation Officer. Long ago, the commander had indoctrinated them with the principle that on occasion they would have to be delegated with the power to make decisions and issue necessary orders on behalf of the commander. As a result they were unafraid to take responsibilities and issue orders and did so promptly. The Commander, S-3, S-2, S-1, the majority of the special staff, and all the company commanders were momentarily tied to the command post awaiting the arrival of the regimental commander and the subsequent issuance of his orders. But not so our little logistical staff. The general plan was all they needed in this situation. They did not even need to hear the details of the operations order until later. Their job was to accomplish the seemingly impossible to carry out their portion of the army's plan. Well, let us see how they did it.

Company executive officers had been alerted by company commanders to stand by for administrative instructions and to get the troops fed, ready to move, and assembled by 1630. S-4 and the Transportation Officer hastily formulated their general plans of

action. S-4, using a command post phone, told the executive officers of the companies to have noncommissioned officers make rapid checks for ammunition and ration needs and draw shortages by platoons from the kitchen trucks and the battalion ammunition section in the battalion motor pool where all transportation was under battalion control and centrally located.

S-3 by telephone informed the executive officers of tentative operations plans (initial points for the march, anticipated order of march, proposed attachments to companies, etc., final details later).

Transportation Officer assembled the transportation noncommissioned officers, oriented them briefly on the situation, and then gave them specific jobs to do. Heavy weapons company motor sergeant was instructed to pull his twenty trucks to the head of the motor pool near the IP [initial point] so they could be pulled out by platoon or section on call to fill in anywhere in any company combat team column. Battalion motor sergeant was instructed to have the balance of the vehicles (rifle company, weapons carriers, staff vehicles, antitank platoon vehicles, pioneer and ammunition vehicles, and communications vehicles) in a flexible position to be pulled into column on call. Another noncommissioned officer was sent to the rear of the battalion area to halt the tanks and antitank platoons a sufficient distance back to prevent interference with formation of the company combat teams and to facilitate pulling out elements to be included in the teams depending on final orders. Transportation Officer then instructed another noncommissioned officer to meet the incoming trucks intended to motorize the battalion and pull them up bumper to bumper with the head of the column at a point where trucks could be peeled off and dispatched up the road to company loading areas.

These are essentially the elements of the necessary plans and orders issued in the name of a commander by a well-trained staff under exigent circumstances. These plans were being executed while the regimental commander issued his orders and the battalion commander issued his subsequent orders. The command was in a state of readiness to move and the members of the logistical staff were able to learn the final orders when they reported back to the battalion command post after the orders had been given. Key noncommissioned officers were stationed where they could pull out trucks of any of the elements as the columns were formed and moved out.

As the tail of the battalion started to pull away from the area, the head of the "X" Division, Motorized, came into view. Rain had commenced to come down in torrents but the "screen" was on its way followed by the complete "X" Division in compliance with army plans. The little cogs in the logistical wheel had turned according to the engineers who had designed them and, unbeknown to the higher echelons, it was because the "chief engineer" of the battalion had taught his staff a few things he had learned back at Leavenworth.

To the natural born leader, if there is such a person, the power of decision is a second nature. It is inherent in the man. The leader must be decisive. He must have confidence in himself, and here again he must have knowledge and be physically and mentally fit. A poor decision promptly rendered and vigorously followed is infinitely better than no decision at all. Vacillation has no place in the make-up of a real leader. However, wrong decisions if made too frequently lead to loss of prestige and lack of confidence. The real leader is never a straddler.

—Major General H. J. Brees, former Commandant,
Command and General Staff school

A Lesson in River Crossings

LIEUTENANT COLONEL ROY T. DODGE
83d Infantry Division Engineer

THE assault crossing of the Elbe River by the 83d Division encompassed every element from the text book and battle notes. The points learned and practiced by the division in training and in previous crossings of the Weser and Leine Rivers (which were, in effect, "dry runs" due to the enemy's disorganization) were successfully put into execution in the final test. Of the points proven, two stand out vividly. They are: (1) *Ferry!* There is nothing so useless as an unfinished bridge. (2) *Take every precaution* in protecting your bridges, especially when your bridgehead is on the upstream flank or is the only one in your sector.

FERRYING

The construction of ferries should begin as soon after the assault waves cross as the situation will permit. Infantry support rafts should be constructed and operated in every river crossing on a stream wide enough to allow their operation. In connection with this type raft, use the five-ponton raft in preference to the three-ponton in streams with a current greater than four feet per second. The three-ponton raft can be constructed in somewhat shorter time and can be operated with only one twenty-two horsepower outboard motor, whereas the five-ponton requires two such motors and coordination between the operators. However, other points outweigh these. The three-ponton raft will only transport a ¼-ton truck, a ¾-ton truck, or a *standard-loaded* 1½-ton truck *without* trailed loads. The early needs of the infantry are the ¼-ton ammunition and evacuation vehicles and their antitank guns towed by 1½-ton trucks. Since the apprehensive soldier invariably overloads his vehicle, the five-ponton raft is the answer, as it will transport his overloaded 1½-ton truck with the towed 57-mm gun, an ambulance and a ¼-ton truck, or two ¼-ton trucks, with ¼-ton trailers.

As soon as he can get it, the infantryman needs his supporting tanks and tank destroyers. If the bridge requires more than three hours for completion, a heavy raft is in order. The five-float, M-2, treadway raft serves the purpose even though it is a bit unwieldy and slow in operation. This requires a utility power boat for motivation, the outboard motor being too low-powered and erratic in operation. As an added note, it is better to have the unit constructing the bridge also construct the raft. Constructing the raft as a separate operation leads to confusion and overlapping among the working parties.

After the bridge is completed, keep your rafts ready and close at hand until all threat has been removed. A bridge may be knocked out or damaged; the ferries are flexible and expendable.

SECURITY

We learned from notes on the Nijmegen and Remagen operations to expect any of the following: (1) artillery, (2) aerial attacks, (3) floating mines, (4) under-water swimmers, (5) power launches. Precautions were taken in anticipation. First the artillery was taken in hand by deception (see below) and counterbattery. The air attacks, which started as soon as the bridge was begun and were repeated at dusk each day, were made ineffective by our antiaircraft units going into position at the bridge site early. During the entire operation only one bomb came close enough to puncture a few floats, and repairs were made without halting the flow of traffic.

An anti-mine boom was installed upstream of the bridge and riflemen were stationed at advantageous points upstream as well as on the ends of every fifth ponton of the bridge itself. The boom was made of steel cable supported by logs and launched in sixty-foot sections, anchored at each end. These were staggered to cover the entire river and were placed in depth. In this way, a mine would only knock out one section and a string of mines would have less chance of

getting through the several bands. Fifteen type GL mines were exploded by the boom and rifle fire and none reached the bridge.

A net made of three strands of barbed-wire concertina was lowered into the stream and from a boat anchored upstream five-pound charges of TNT were dropped overboard at five-minute intervals during the hours of darkness. This effectively foiled an attempt made by underwater swimmers to demolish the bridge. The swimmers were trained at a school in Venice, Italy, and were equipped with rubber suits, oxygen respirators, and a 3,200-pound torpedo bomb. Interrogation of the three swimmers captured revealed that they became entangled in the nets and lost control of their bomb. One swimmer was seized with cramps caused by the explosives and a resulting tear in his suit.

Assault guns were located on each side of the bridge both upstream and downstream to fire on power launches that might be directed against the bridge. This was the only precaution which was not tested, as no launches came. A number of river barges anchored upstream supplied still another threat inasmuch as they might have been cut loose from their anchorage. These were guarded and a few nearest the bridge were sunk by us to remove that threat.

To complete the defense, a communication system was installed with phones at bridges and security outposts and a radio net as a standby. In this way, the instant a mine was sighted upstream all posts were immediately alerted and early reports relayed to higher headquarters.

Deception

There were two bridging possibilities; a partially demolished railroad bridge and an old ferry site 1,000 yards upstream therefrom. Apparently the enemy was not certain of the amount of damage he had been able to effect on the bridge inasmuch as subsequent events indicated his concern over it. We determined that it was not feasible to repair the bridge and selected, instead, the ferry site using an M-2 treadway bridge. However, the assault infantry crossed nearer the railroad bridge. During this crossing an enemy reconnaissance plane circled the area. About two hours later a number of self-propelled guns on the far shore opened up and for several hours the shells rained in on the then unused infantry crossing site and the railroad bridge. Engineers working upstream kept an apprehensive eye over their left shoulders and worked in peace, thankful of the German habit of doing little traversing and searching. Shortly after the first tank destroyers were ferried across, the fire was silenced. It was necessary to employ searchlights producing "artificial moonlight" for the working parties and traffic control for several nights afterward. A special point was made to keep at least half of the lights over the area the enemy had "zeroed-in" and the remainder over the actual bridge site.

Engineer Troops and Responsibility

Regardless of the number of supporting engineers available, give the Division Engineer full control of his organic battalion. He knows intimately their capabilities and responses, has confidence in them, and needs them for the emergencies that arise. However good the supporting engineer troops may be, they are, to a certain extent, an unknown quantity.

One person, and only one person, should have the responsibility for the security of the entire river itself and the bridges, since divided responsibility inevitably causes delay in execution and allows "holes" to develop in your defense. This person should be the Division Engineer since he best knows the river line and measures to take. Necessary additional equipment (guns, antiaircraft, searchlights) and personnel to guard adequately the river and bridges should be placed under his control.

Conclusion

A bridgehead succeeds or fails in the early hours of the crossing. However good the infantry troops are, they must have supporting antitank weapons early before the enemy

can mass his armor for a counterattack. This can best be accomplished by ferrying. Whether the enemy will employ any or all his tricks to destroy your bridge is problematical and requires G-2ing, not only by the intelligence section but also by the Engineer (it is his dilemma if the bridge is lost). If in doubt—do it, and don't overlook any possibility. Outguess them and use your ingenuity.

Bombing German Railroads

From "RAF Bomber Command" in *The Fighting Forces* (Great Britain) August 1945.

A GENERAL staff officer of the Office of the General des Transportwesens West has given his account of the difficulties experienced by the German Army as a result of our air attacks on the French railways. He said that the air offensive against the French railways, in his opinion, made a greater contribution to the defeat of the Wehrmacht in France than any other single factor.

The first effect of the offensive, according to the German staff officer, was to block lines along the Franco-Belgian frontier, roughly from Sedan to St. Omer. The first result of this was upon French war industry working for the German Army. From the beginning of May 1944, northeast to southwest traffic had been so paralyzed that coal could not be brought from France but had to be got from the Saar and brought by east to west lines, then needed for exclusively military traffic. Before the offensive began in March, German military rail traffic into France, including traffic for the Todt organization building V-weapon sites and the defenses of the Atlantic Wall, was at the rate of more than one hundred trains a day, sixty or seventy of which went through the network of railways round Paris which, of course, was particularly heavily bombed. By the end of April only forty-eight trains a day were getting through the Paris network, and by the end of May only thirty-two, of which twelve were Saar coal trains, so that purely military traffic was at the rate of only twenty trains a day. By the end of April the normal accumulation of trains in France held up because of air attack was 1,000 trains. Previously the normal accumulation was never more than 120 or 130 trains. The circular railway round Paris, the Grande-Ceinture, was so disorganized that for some time it was not even possible to move one division through the Paris area.

The staff officer gave a list of railway targets attacked, in order of their importance to the German Army. These were:

1. **Major railway bridges.**

2. **Railway centers, containing essential railway facilities in the following order of importance:**

a. Locomotive servicing facilities, round houses, turntables, coaling facilities.

b. Switching gear.

c. Signals systems, including telephones.

d. Marshalling and shunting facilities.

3. Trains and railway lines attacked singly by fighter bombers.

This is precisely the order of priority in which the targets were set out for air attack when the offensive was planned by the Allied air staffs; the aiming points in marshalling yards were always chosen to cause the maximum damage to locomotive servicing facilities.

The German staff officer also said that the supply of the V-weapon sites was seriously interrupted by the disorganization of French railways.

Communications in Pacific Ocean Areas

BRIGADIER GENERAL C. A. POWELL
Signal Officer, Headquarters, Army Forces, Middle Pacific
(Formerly Pacific Ocean Areas)

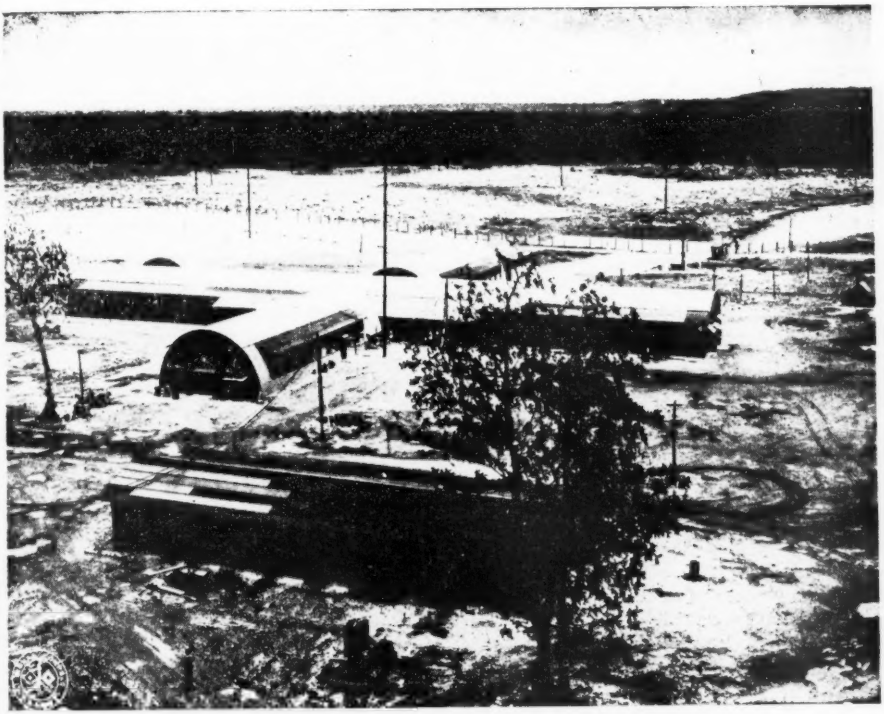
BECAUSE of the so-called island-hopping characteristics of the military campaign in the Central Pacific Area, a new conception of communication requirements developed which necessitated the establishment of communication facilities on a hitherto unprecedented basis. Unlike normal land operations where tactical, operational, and logistical communication service is supplied by rapidly extending a wire communication network concurrently with the advancing military forces, and supplemented where necessary by radio communications, it was necessary in the Pacific Area, consisting of small dots of islands separated by great expanses of open water, that the burden of operational and logistical traffic supporting tactical forces and their supporting service elements be discharged through the medium of radio communication. This meant that a far-reaching network of long-distance radio circuits, point-to-point in nature, and on a scale previously never conceived from a purely military angle, was necessary. In addition, as each small island was captured and secured, its early and rapid development as a base of operations against the next enemy outpost required the installation of an elaborate and complex wire communication system. This system, although its scope was small in area, had to be designed to meet the high concentration of troops and facilities necessary for the simultaneous tactical defense of the island, its use as a naval operating base for continued operations against the enemy, its similar use as an air operating base, and, finally, its use as a supply point in the logistical system supporting the following operations.

In order that the development of the necessary communication systems could be designed to meet the tactical, consolidation, and development phases of such a base and accomplished in a rapid and orderly manner, the planning for communication facilities and later the construction and installation was divided into three phases which were termed the assault phase, the consolidation phase, and the development phase. In Central Pacific operations against islands and atolls, the assault was generally accomplished by Marine Forces or a combination of Army and Marine Forces operating under the Commanding General of the Fleet Marine Force or some designated subordinate. Communication planning for this phase was accomplished by the Marine Forces in conjunction with the Staff of CinCPac, the overall Area Commander. Therefore communication planning, insofar as the Signal Officer of the Central Pacific Area was concerned, pertained primarily to the consolidation and development phases.

The consolidation phase of operation against a Pacific island or atoll commenced normally with the declaration by the tactical commander that the island was secure and that all organized enemy resistance had ceased. At that time the command of the island usually passed from the tactical commander to an island commander, who was charged with the responsibility for the development of the base along the lines of a previously established plan which, of course, was dependent upon the mission the island as a base was to play in future operations.

In order to promote local security and establish a tactical defense during the base development, it is necessary that temporary communication facilities be immediately installed. It is during this period that air fields are constructed, harbor facilities installed, and fixed defensive installations established. To meet the requirements of an extremely rapid build-up of internal communications during this consolidation period, a temporary wire net is installed utilizing rubber-covered cable and field wire and a field type telephone exchange, most of this material being landed from D plus 5 to D plus 20 and installed as rapidly as headquarters locations are decided upon, airfields can be surveyed, and fixes established on

defense installations. Inasmuch as airfields for noncombatant aircraft as well as tactical aircraft are required at the earliest possible moment, mobile airways communications equipment must be brought in to provide the necessary navigational aids, point-to-point communication, and control tactical facilities for handling this air traffic. To insure proper logistical and administrative support of the newly won base from rear areas, mobile point-to-point communications are required. Under policies established by CinCPac in the Central Pacific Area in order to conserve insofar as possible the critical supply of frequency assignments for radio circuits, an establishment known as a Joint Communication Center is set up as soon as the senior commander goes ashore. All point-to-point administrative and operational circuits terminate at this Joint Center. All cryptographic facilities, with the exception of those used by tactical troops and the Air Forces, are established at the Joint Center. All command, operational, and administrative traffic pertaining to the base goes through this Joint Center and is distributed locally by landline teletype circuits or messenger. It is desired to point out at this time that, unlike normal land-based operations where supply and logistical support facilities are moved forward with the progress of the tactical troops by the advancing of railhead facilities, in this type of operation an island base must remain such and continue to sup-



JCA Center, Guam. (Signal Corps Photo)

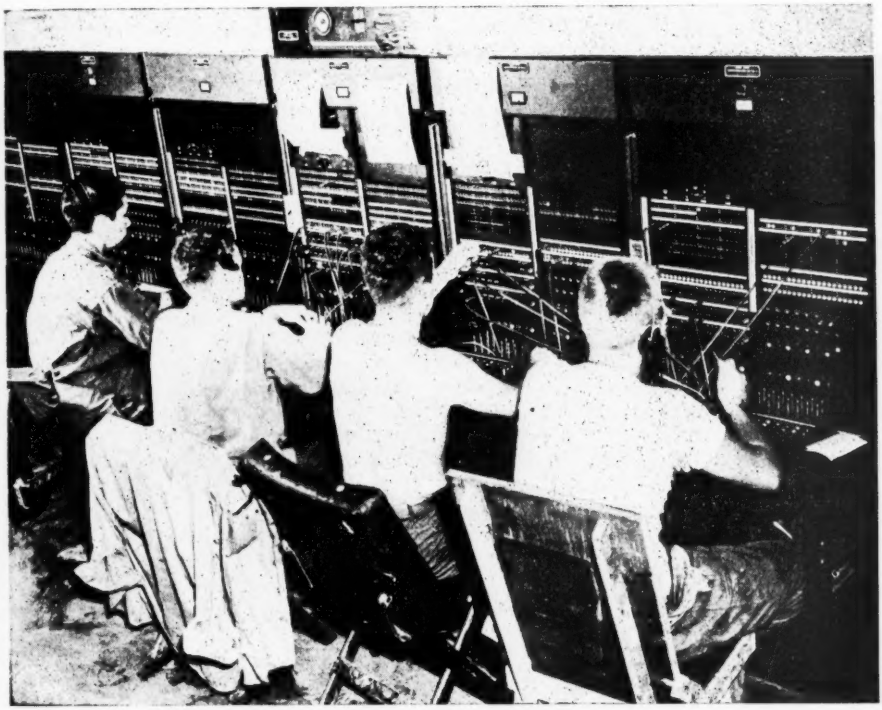
port forward operations for many months. Therefore the normal temporary facilities, which are usually expected to serve an army on the move, soon become inoperative due to failures and from being too small in scope to meet the rapidly increasing requirements

Transmitter Building, JCC, Saipan.

with which an army is faced. As rapidly as the necessary supplies can be made available and brought in, more permanent communication facilities on a much larger scale must be established. These permanent facilities include submarine, buried, and aerial cable circuits, sometimes with cable as high as 600 pair, 1,000 and 2,000 line commercial and automatic switchboards, and attendant distribution systems. Permanent high-powered radio communication equipment provides high-speed radioteletype, Multiplex and multi-channel radio circuits, radio photo, and news and press facilities. These facilities are installed during the development period coincident with the final development of the airfields such as black-topping, establishing of hardstands, installation of weather stations and airways terminals, construction of warehouses, repair and maintenance depot facilities, docks, and a thousand and one other installations which are necessary for the operation of a permanent base.

As the axiom of keeping pressure on the enemy, getting the enemy on the run and keeping him on the run, and hitting him when he is off balance applies as well if not more so to an island-hopping campaign than it does to land operations, it is obvious that the need for speed in developing these com-

munications is paramount; and it becomes apparent that the job of planning and providing equipment and personnel, so that the development of communications from the first field wire circuits of the initial landing parties to the final complex structure necessary for the proper operation of the base will flow in an ever-expanding upward surge, is a tremendous task. Coupled with this is the difficulty of echeloning the supplies and personnel into an overcrowded shipping schedule so that the arrival is properly timed to meet the need and that huge stores of supplies are not piled up prior to the time they can be used, and so that installation and construction personnel will not be kept idle waiting for the late arrival of necessary materials.



Switchboards at Erie Exchange, North Field, Guam. (Signal Corps Photo)

Though the land mass of these islands is small, some idea of the immensity of the communication system on each island can be gained from the following comparisons. On Kwajalein just prior to the Marianas invasion the telephone system compared favorably in size with Lexington, Massachusetts. Saipan, prior to the basing of B-29's, had a telephone system comparable to the city of Independence, Missouri. When B-29's came in, this system expanded overnight to treble that size.

Guam's telephone installation was initially planned and installed similar to that on Saipan. With the basing of B-29's on this island and the establishment of advance headquarters of Admiral Nimitz, the expansion of the telephone system, all of which

was Army and Signal Corps responsibility, exceeded all anticipations. The demand for services became so great that automatic exchanges were a necessity. The telephone system on Guam was larger than the system now serving Cedar Rapids, Iowa.

Plans for Okinawa included the use of enough wire to establish one hundred circuits between Maine and California. More telephone equipment was to be used than for a city comparable in size to South Bend, Indiana.

It is not possible to go into a detailed explanation of the radio facilities required in the vast Pacific area, but it can readily be seen that because of the widely scattered islands the equivalent of a long lines telephone system interconnecting these various concentrated bases was only possible through the medium of radio. Many command and administrative circuits were required to handle general traffic only. Most of these circuits were radioteletype, and the main Army traffic relay station on Oahu, through which a large portion of traffic was relayed, handled well over thirty million groups of radio traffic per month.

In addition to these major traffic-handling facilities, radio circuits were required for airways facilities, air warning systems, and weather and intelligence circuits for the Army alone, to say nothing of the huge network required by the Navy for operation of the great Pacific fleets. Those versed in radio communication will readily appreciate the almost insurmountable problem of frequency assignment caused by such a congestion of radio facilities in one area. Added to this was the necessity of providing suitable frequency assignments for thousands of tactical radio sets engaged in each operation.

Comments from various commanders engaged in these operations have been universal regarding the high standard of efficiency and satisfaction of communications in these operations and during interim periods devoted to planning and preparation. These comments, while usually directed to the actual operating personnel and units, are also the highest commendation possible to the small group of Signal officers who, through long and arduous hours of difficult work, prepared the plans and earned the motto, "They also serve." To them "the proof of the pudding has been in the eating."

Maintenance Still Needed

THE end of the war has not meant the end of maintenance activity in the Army, it is pointed out by Maintenance Division, ASF. In fact, for the time being, maintenance has become even more important. This is because the procurement of new replacement equipment has ceased, which means that equipment now in use must be kept in working order, come what may. If soldiers want to ride, they will have to continue taking care of their vehicles.

Furthermore, vast quantities of matériel which is to be disposed of must be protected against damage and deterioration by periodic maintenance services while in storage or shipment.

It is hoped that Army personnel will continue to be maintenance minded—for maintenance of equipment will always be as much a part of Army life as pay-day.

Emergency Air Supply Operation

LIEUTENANT COLONEL LYNN D. WALLACE, *Infantry*
Instructor, Command and General Staff School

THE situation was tense and it was reflected in the weary faces of the assembled division staff. G-3 quickly stated his estimate of the situation, the contents of which had been common knowledge to all present for the past few hours. The enemy had taken up a strong defensive position in the village astride our main axis of advance. In the rear, a strong enemy force had cut our supply line. The division was isolated, isolated by an aggressive enemy intent upon destruction of this hard-hitting armored force that had caused it to retire through a series of fast blows. Freedom of movement was lost to the division, limited to the existing motor fuel in the division vehicles. Fire power could be sustained for a day or so, and the men would eat for two or three days. But the advantage gained by the powerful armored thrust deep into the enemy position was in apparent jeopardy of being lost. If the drive continued, the entire enemy front would have to fall back. A great deal was at stake!

There was no lack of confidence on the part of the staff in their ability to rout the enemy. They had them on the run and they intended to continue the pursuit. Supplies—motor fuel—that was written on their faces. And only the G-4 seemed unconcerned.

Presently the air liaison officer attached to the division reported to the G-4, audibly enough for all to hear, that a situation landing field had been located south of the village. He had just completed his inspection of it while making a reconnaissance of the village. The field was suitable for landing C-47's and could handle about thirty an hour if required.

There was a quiet conference between G-4, G-3, and the division commander, and then without hesitation the division commander issued his order: "Take the airfield, establish a permanent defense, and continue the assault on the enemy's position in the village. G-4, request an emergency air supply lift for one armored division and our attached units. Also, request that the fighters that provide cover for the transports carry bombs and pound the enemy's position in the village. G-3, prepare a plan of attack on the village for dawn tomorrow."

Thus, a situation which in former wars would mean defeat or partial destruction of an entire division, by emergency air supply was turned into one of tactical advantage, that of continuing to pursue a hard-pressed enemy.

Air supply operations became common practice in all our theaters in the war. Emergency air supply operations likewise were carried out in our various theaters. As a result of these operations, a technique was developed which eliminated most of the "emergency" from such operations. This technique requires the coordination of air, ground, and service forces in its planning preparations and operations.

Tactical operations often indicate that units, varying in size from a single infantry division to a corps of several divisions, may become isolated and deprived of their normal means of resupply. Such operations may include the situation above set forth or a river-crossing below a series of dams which are under enemy control. Under the latter circumstances, the possibility of the enemy blowing the dams or opening the sluice gates to cut off the attacking force on the far shore is a distinct possibility which must be taken into consideration, as well as the resulting problem of continued supply. It is for such situations that the emergency air supply operations and their technique were perfected.

This technique is broken down into several steps that must be performed by the ground combat troops, the air force, and the communications zone. All of their efforts must be coordinated and the procedures and responsibilities of each clearly defined by the theater commander.

The highest ground headquarters must prepare, or have prepared, a list of the minimum requirements of items of supplies

of all services that are required to keep a given unit fighting for one day. A separate list must be prepared for smaller units that are generally normal attachments to these divisions. These lists must be prepared in accordance with the expenditure experience in that theater. The items on this list for a given unit constitute the basic "brick" for that particular type of unit.

Communications zone must designate some agency that will be responsible for delivering the items called for in each of the various "bricks" to the designated air fields. This agency should be responsible to see that all items except those to be repacked for air drop are packed or packaged in such a manner as to insure ease of handling in loading and unloading to and from an air transport and minimum damage on exposure to the weather, at the same time keeping the loss of valuable cargo space and weight, through careful packing, to a minimum.

Critical items should not be included in the emergency "bricks" that are stacked on the airfield for emergencies. However, they should be made available for actual operations and the procedure must be set up to furnish these critical items to the airfields on call without regard to normal channels or formal requisition. A phone call from the air base to the technical service depot stating "Send critical items for an infantry 'brick'" should be sufficient. The depot should then be responsible for delivering these items as a first-priority depot operation.

The theater air force acting through a designated theater agency handling air supply decides which field or fields will be used for mounting these air-supply operations. As these supplies may have to be delivered by air drop, glider or transport, or an emergency strip, the designated airfields will be those of the Troop Carrier Command. In making the selection of airfields at which emergency "bricks" will be stocked, consideration should be given to their proximity to communications zone depots, particularly in cases where the number of items on the critical list is large, as well as giving consideration to numerous characteristics of the fields selected that make them desirable from an air point of view.

Having selected the fields, the "bricks" for air supply should be delivered by the communications zone, broken down into plane loads at the field, and suitably stored to protect them from the weather, and at the same time so located that they can be available for stowing into several aircraft simultaneously and directly from place of storage. Similar provision should be made to have available "bricks" for air drop.

As the air force will also have to arrange for fighter cover for the transports and procedure for this must also be direct, simple, and without delay, so the transports will be assured of necessary protection during the operation.

To make these operations effective all ground units should have practice in emergency air supply as part of their training program. This training would include use of panels to mark an air strip or dropping zone, training in unloading planes, and care in handling supplies once grounded. Whenever a rated pilot is attached as an air liaison officer to a unit, he would select the dropping area. however, all units should have several officers trained in the requirements for such fields or areas, either to assist the air liaison officer or to make tentative selection themselves.

Having prepared the lists, stockpiled the "bricks" on air fields, and trained the units in handling air supply, the next requirement is to develop a simple, direct method by which an isolated unit calls for an emergency air lift. This must be direct to the agency responsible for making the air lift, disregarding the normal command and supply channels. A radio message stating number and types of "bricks" required, location and availability of air strip, or whether an air drop is required, should be sufficient information to put into operation the supply procedure that will cause the needed supplies to reach the cut-off unit.

The procedure outlined above may be refined in any operation where such an air

lift is contemplated by the addition of pathfinder teams. However, the above procedure has enabled many units to continue their operations with the knowledge that air supply was on the way in a few hours from the receipt of the call for emergency air lift.

Army and Navy Munitions Board

From a release by War Department Bureau of Public Relations Press Branch

THE President, as Commander in Chief of the Army and Navy, has directed that the Army and Navy Munitions Board take over the important postwar assignment of planning for industrial mobilization in the event of a future emergency.

This means that the Board will become one of the key agencies in the defense program to be adopted to safeguard the security of the United States after the present wartime military establishment is demobilized.

The Army and Navy Munitions Board was originally activated in June 1922 by the then Secretary of War and Secretary of the Navy to plan industrial mobilization for war purposes.

The Board formulated the Industrial Mobilization Plan of 1939 which was made available to the agencies later assigned the task of mobilizing the resources of the country for war.

After the start of the war the Board worked with the War Production Board and other agencies on current Army-Navy problems such as stock-piling strategic materials and determining priorities.

During the postwar period the Board will have a much bigger job than it had either before or during the war.

It will have the tremendous responsibility in connection with the development of new weapons and of planning how they may be produced in quantity should the need arise. Some of these weapons were just coming into use when the war ended and their full potentiality is not yet known. This will make industrial planning extremely difficult.

Another function of the Board will be to coordinate the procurement and other current industrial activities of the Army and Navy. Joint procurement by the two services has expanded greatly during the war.

The Board will not only coordinate the current joint procurement and procurement planning of the two departments; it will direct and supervise the work of all the joint Army-Navy boards and committees dealing with industrial matters. The number of these agencies has increased sharply during the war.

As a result of the increased responsibilities of the Board, the President directed that a civilian Executive Chairman be appointed as head of the Board to assume active direction of its operations.

The Board will report directly to the President through the Secretary of War and the Secretary of the Navy.

Working with the Board and making recommendations to it on matters of major policy will be a Policy Committee consisting of the Commanding General, Army Air Forces; the Commanding General, Army Service Forces; one general officer of the War Department General Staff designated by the Chief of Staff; a representative of the Under Secretary of War; the Chief of the Office of Procurement and Material (Navy Department); the Deputy Chief of Naval Operations (Air); an officer of flag rank designated by the Chief of Naval Operations; and a representative of the Assistant Secretary of the Navy.

Since agencies and departments of the Government other than the War and Navy Departments have a vital interest in industrial mobilization, it is intended that they will take an active part in this planning.

The Capture of Ipo Dam

COLONEL C. P. ROBBINS
Chief of Staff, 43d Division

Manila, 20 May 1945: American 43d Division troops and Filipino Guerrillas drew tighter a mountain trap on thousands of Japanese in the Sierra Madre east of Manila Saturday after capturing Ipo Dam, source of one-third of the city's water supply. The Nipponese force is believed to be the largest ever completely encircled in the campaign to liberate the Philippines. Officers reported the trap was closed Thursday when the doughboys and Filipinos secured the vital dam intact.

THE story behind this brief communiqué is of special interest to all infantrymen. Not only does it illustrate again the truth of the doctrines of Sun Tzu in 500 BC, but also it demonstrates the complexity of their application in our times.

This battle was a division show, a division reinforced by the various and sundry special weapons of modern war. The terrain over which it was fought was the rugged, red clay, brush and bamboo-covered foothill area of the Sierra Madre range on Luzon. The objective was definite—the Jap-held Ipo Dam, which furnishes one-third of the water supply of Manila.

The enemy was a well-organized, coordinated force of some 4,500 Japs amply supported by artillery. They had retreated into the position early in the campaign taking with them ample supplies of food, ammunition, and medicines. They had spent their time well, digging elaborate caves, each a self-sufficient unit—gun position, an extensive system of trenches, and spider holes. Their main line of defense faced west, astride the Metropolitan Road where it passes through the Bigti "Palisades" from the paddy fields up to the high and hilly plateau south of the Angat River. Their avowed intention was to fight to the last man.

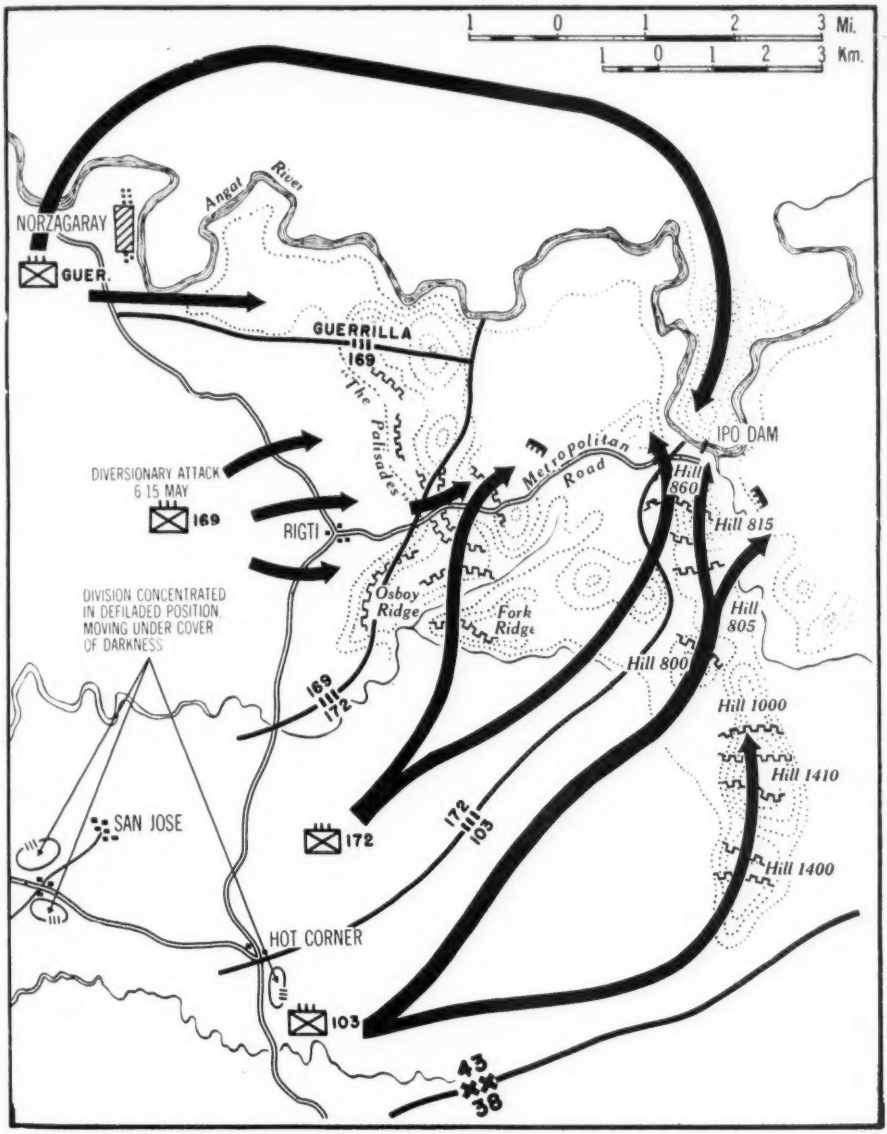
Prior to this battle, the 43d Division, less the 169th Regimental Combat Team, had been mopping up the Antipolo area after rolling up the south flank of the famous Jap "Shimbu Line." The 169th Regimental Combat Team, as a part of a composite force, was containing the north flank of this same line in the Ipo Dam sector. The center of this long, rugged defensive position was currently under attack by another division of the corps.

Upon receipt of its new mission—the capture of Ipo Dam and the destruction of an estimated 4,500 Jap defenders—the staff planned the operation and initiated the forty-mile move from one flank to the other simultaneously.

To attain surprise, the secrecy of this move was essential. Concealed assembly areas, well back from the chosen LD (line of departure), were selected in advance for the initial deployment. Unit markings on all incoming vehicles were covered; convoys moved at night and blacked out. Normal daytime traffic by the 169th Regimental Combat Team was maintained, but vehicular movement of all kinds by other troops was restricted to night time only and under strict light discipline. Essential reconnaissance by a minimum of personnel and vehicles was permitted. The troops scheduled to attack lay "doggo" all day and worked feverishly all night.

The artillery plan of fire was so designed as to indicate no increase in strength in the area and at the same time to build up an easily recognized fire pattern. This pattern was based on the time of the coming attack and included the use of WP (white phosphorous) shells on certain landmarks which had been chosen to serve as guide points during the night approach march. Thus the value of such fire could be obtained when needed and meanwhile the Jap was being lulled and routined in keeping his head down during what was to become a critical time period in the coming battle.

The plan of attack envisioned a stealthy approach under cover of darkness and a subsequent swift and wide envelopment from



The 43d Infantry Division seizes Ipo Dam, Luzon, in wide encircling maneuver. 6-17 May 1945.

the south by two Regimental Combat Teams, the 103d and the 172d. On the north, the "Phil-American Yay Regiment" of guerrillas, which had been trained by and had fought with the division in the past month, was to move on foot trails over the mountains north of the Angat River and come in on the objective from that direction in conjunction with the main attack from the south. The 169th Regimental Combat Team, in position facing the most formidable part of the Jap defenses, was to continue to provide a screen behind which the southern assault force assembled, and, as it moved through this screen, to reassemble its flank elements in preparation for an attack to be coordinated with the inside flank of the envelopment.

The night movement of the southern force into its forward assembly areas was smooth, uneventful, and undiscovered. The "passed through" elements of the 169th Regimental Combat Team were quickly assembled and redisposed. The guerrillas on the north moved quietly and steadily eastward over the footpaths across the rugged mountains that dominate the dam from across the Angat River. The only Americans with them were FO (forward observer) parties from division artillery, whose part in the coming attack was to be a source of both wonder and salvation to this gallant force. All was well and the battle was "developing according to plan."

During the next day the troops lay quietly under cover and made their final preparations for battle. Morale was high—so far so good. That night they moved out.

The extreme right flank met only light opposition and secured the first of the chain of hills paralleling the advance from which that battalion was to cover the exposed right flank. The rest of the force made only scattered contacts. The center engaged in a few patrol clashes and the guerrillas began to encounter the Jap outposts north of the dam.

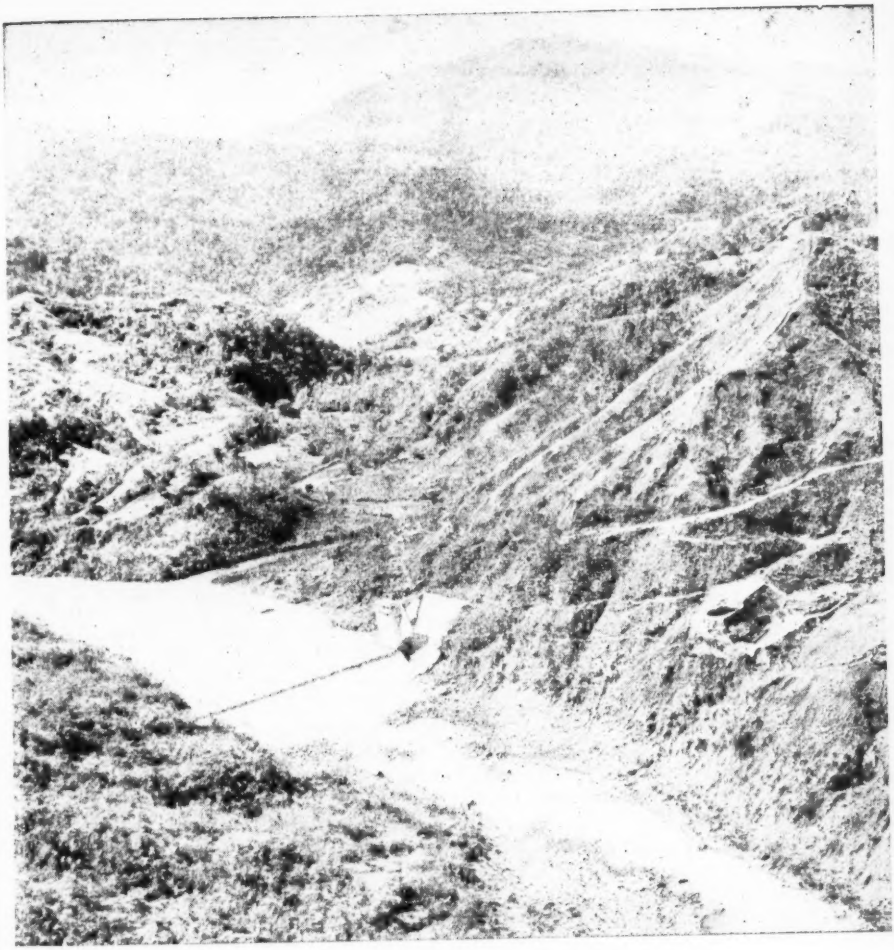
Meanwhile the attached tankmen reconnoitered all sectors in anticipation of and in preparation for their early employment where terrain favored and battle dictated.

Communications were a problem in so widespread a situation, yet—communications there must be. Wire was pushed behind the advancing southern force and it became a heartbreaking job to lay and maintain it as the attack moved forward. Only radio could be used with the guerrillas in their trek to the north and, thanks to the air-dropping of batteries, it served admirably.

The following day, as the southern force moved north, the situation began to develop. Fighting became general and brisk along the entire front. Well-coordinated Jap artillery fire increased steadily, and as the familiar "dugout-dug in" cave defenses were spotted and a definite defensive pattern facing *west* appeared, it became obvious that the advantage of surprise had been realized and the Jap was caught off base. Caution was thrown to the winds and the tempo of the attack was stepped up to a maximum. Engineer dozers grunted and snorted the rough supply roads forward behind the troops. Heavy air strikes were thrown against located positions. Artillery fire increased to a steady drumming roar and the 43d swept forward toward its objective.

Then came the rains. For three days and nights the so-called "pre-rainy season showers" deluged the men, their equipment, and their battlefield. Tortuous supply roads across the red clay hills became canals of greasy mud and slop. Trickling streams became roaring torrents. Visibility dropped. Air strikes were seriously curtailed. Evacuation and supply became—each in its own way — increasingly painful. The tankers looked as gloomy as the weather, with no hope for their employment in that sector for days to come. The prospect of a quick climax was as dark and threatening as the skies above. The attack slipped and skidded to a sodden snail's pace.

The energies of all hands were now concentrated on logistics. Waiting Filipino carrying parties, obtained with great difficulty because of the accessibility of safer work and higher pay nearby, were hustled up to cover the footpaths between forward elements and the "roadheads." All available tractors from divisional and attached units were called



Ipo Dam from the northeast, after its capture. (Signal Corps Photo)

in to drag trailers of all types over the rough and greasy roads in the endless columns of supply and evacuation. Tired and waterlogged men worked day and night to stave off the impending and imminent bogging down of the attack.

Occasional breaks came in the rain clouds and air supply was called in. At first, due to the complex and circuitous channels through which requests and instructions had to flow, these first drops were not too successful. Planes were forthwith attached to the division, and through direct contact on a nearby strip, between the G-3 and G-4 Sections and the pilots and crews of the planes, the right amounts of the right supplies to the right troops became the usual practice. The air crews knew just where to drop, exactly what the situation of the recipients was—even the names of the unit commanders.

Their interest was keen and their work was well done. And they dropped as well for the guerrillas on the north as they did for the American main effort on the south. Coordination of these drops with the continuous artillery fire and frequent air attacks was skilfully handled through the SAP.

As the weather began to clear, the impetus was again built up and the attack accelerated slowly. The importance of speed in the capture of the dam and its good road from the west was now even more apparent to every last man. The Jap, also, realized belatedly what was developing. With his widespread system of well-stocked caves, his relatively short interior lines, and his freedom from dependence on motors, he began a hurried redistribution of his already decimated forces to meet the threat from the south. He drew from his strongest position on the rocky cliffs covering the road from the west. He attempted to displace his artillery; he increased his futile banzai attacks but he was relentlessly pounded day and night by artillery and for three days straight he was subjected to terrific high-explosive and Napalm [incendiary bomb] strikes by P-38's and P-51's in groups of twenty to forty. A-20's plastered his positions daily.

The coordination of this close air support and artillery fire was both touchy and complex but it was so finely handled that artillery fire was never stopped longer than necessary for a strike to slip in, blast the target, and pull out. The full power of the reinforced division artillery was evidenced time and again by the TOT (time on target) concentrations skilfully handled by the division artillery FDC [fire-direction center]. Well directed counterbattery fire had already taken its toll of Jap guns, and many had been overrun by the infantry also. The physical and the morale effects of air superiority were enhanced by the introduction of heavy Napalm strikes on all suitable targets. Unfortunately, the full effect of this type of bomb was curtailed by the soggy condition of the target area. Fire was not spread and carried by the wet grass and brush as it normally would have been. But the later statements of some of the prisoners of war bore out clearly the devastating effects of well-coordinated air and artillery.

The use of antiaircraft artillery searchlight units to illuminate the battlefield at night also proved a thorn in the Jap side. This "indirect lighting" materially hampered his favorite night movement and attack and by the same token was of great assistance to our troops in their night positions, to our artillery observers, and to our supply and evacuation services. The lights also served as reference points for the night fighter patrols which searched out the remaining night-firing Jap guns. Such spottings, passed through the SAP to the FDC, brought prompt and excellent counterbattery.

Other antiaircraft artillery units—both automatic weapon and gun—were successfully employed well forward in direct fire against the strong cliff positions in the Jap center, and not only knocked out many cave positions but also hastened the Jap troops in their withdrawal to strengthen their inner defenses against the southern force.

The final phase of this battle came just ten days after the jump-off. The 103d Regimental Combat Team on the right continued to swing wide and crashed through to seize the southern end of the dam, including the gatehouse. The guerrillas, after bloody hand-to-hand fighting in the mountains to the north, joined the 103d Regimental Combat Team and planted the stars and stripes on the north end of the dam. The 172d Regimental Combat Team, in conjunction with the 103d Regimental Combat Team and a Battalion of the 169th Regimental Combat Team, drove straight north and overran the Metropolitan Road while the remainder of the 169th Regimental Combat Team, assisted by the tanks—at last—crashed through the now weakened defenses around the Bigti "Palisades" and joined the rest of the division on the heights above.

The objective was taken—intact. The swiftness of the 103d Regimental Combat Team's final thrust had caught the Jap with his demolition charges set but unfired. The remnants of the enemy garrison were

now completely encircled, their guns destroyed or overrun, their caches of supplies captured or burned, their communication and control completely shattered, and the few remaining troops scattered and hiding like rats in their holes. The Jap was "damned well licked." His losses were: 108 prisoners, 2,757 counted dead, twenty-five field pieces overrun or destroyed, and a large quantity of small arms, mortars, ammunition, food, and medical supplies. The division lost 172 killed and 676 wounded.

Such was the climax of some 142 continuous days of combat for the 43d Division. From S-day on Lingayen Beach through the long, hard push to the Damortis—Rosario—Pozorrubio road net, the savage "cliff-dweller" fighting in the hills back of Stotsenburg and the driving envelopment of the southern end of the Shimbu line, to the final and complete elimination of the northern anchor of that same strong position.

And, thanks to the modern application of ancient and time-honored precepts, the division considers it a fitting climax to a long campaign during which command, staff, and troop echelons were forged into a "no-star" team by the heat of battle on the anvil of experience.

Combat Patrolling

G-2, 3d Infantry Division

ON the Anzio beachhead, patrolling was elevated to a fine art. Here experiments were carried out with all types of patrols. The lessons taught in field manuals, but never appreciated (nor fully understood) in peace time, were re-learned. The more important were:

a. No patrol should be given more than one mission.

b. Patrol leaders should be carefully briefed well in advance, using maps and air photos.

c. Patrol leaders or their representatives should have an opportunity to study the patrol area on the ground in daylight whenever possible.

d. Weapon requirements of patrols should be carefully weighed and the plan of action of combat patrols worked out in detail and rehearsed.

e. Patrol leaders must give detailed reports, with especial reference to coordinates and times, immediately upon return. These reports must be immediately and fully disseminated (G-2 Periodic is a good medium).

f. Recognition for outstanding patrols should be given quickly, by appropriate awards and by publicity in unit publications.

g. The importance of aggressive patrolling must be made plain to all personnel. Good patrolling cannot be expected from units with low morale. In special situations, employment of special patrolling units (battle patrols) which are not required to do front-line duty is justified. Static situation on Anzio beachhead is best example of such a situation.

h. Willing horses in the form of natural-born patrollers must not be worked to death. The best patrol leaders will go to pieces if sent on difficult missions for several successive nights.

i. Deep reconnaissance behind enemy lines is extremely difficult and should never be fully relied upon to produce information.

After the division's experience on Anzio, nothing more than an occasional brush-up was required to bring our patrolling to the pitch of excellence. In France and Germany, regiments patrolled continually and without urging.

The Redlegs Grow Web Feet

LIEUTENANT COLONEL WILLIAM J. LEWIS, *Field Artillery*
Instructor, Command and General Staff School

AMPHIBIOUS warfare—the landing of waterborne troops on hostile defended shores, and the development of adequate beachheads for subsequent operations—is not new. This type of warfare is as old as warfare itself, as are the special problems presented to each arm or service engaged in such warfare. However, never before in history have amphibious operations been attempted on a scale comparable to those of the present war, nor have landing forces been accompanied by such tremendous fire support as is now the rule. In the recent conflict, the necessity of performing successful landing operations against modern defenses required that these defenses be neutralized by modern means. Doctrines had to be developed exploiting to the maximum the terrific fire power of modern naval gunfire, aerial bombardment, and field artillery fire against shore and near-shore defenses. It is the purpose of this article to describe the organization and employment of field artillery in operations of an amphibious nature.

The use of artillery in amphibious operations presents a very special type of employment that differs greatly from normal field artillery operation in many respects. We will have to accept, whether we like it or not, several very vital differences. The chief of these differences are: (1) complete lack of field artillery support until some time after the landing, (2) smaller amounts of artillery, (3) greater boldness of artillery employment, (4) greater control and coordination necessary between the artillery and other arms, (5) the possibility that control within the artillery may have to be decentralized, (6) the stripping of artillery units to bare essentials in both personnel and equipment, and (7) the lack of any chance for artillery survey during early stages.

Let us go into these differences in greater detail.

First, ground must be gained by the infantry before field artillery can emplace and support it. This is not always true but generally is. Landings on Kwajalein were supported by artillery that had been landed at D minus 1 on a nearby lightly defended island. But since our Tables of Equipment do not yet include an island, waterborne, semi-mobile, we shall not have undefended islands conveniently located to the bulk of our landing beaches. Our forces will have to land without field artillery support, and when such is the case the supporting fire of the field artillery landing behind the infantry cannot be expected before H plus 2 hours.

Since the field artillery cannot support the landing and since a landing against a defended shore would be suicidal without support, we must make maximum use of our naval gunfire and air bombardment until the field artillery is ashore and prepared to take over its mission. All preparatory and early support missions will come from naval guns and aviation.

The amount of field artillery in the initial stages of a landing operation will be less than in a land warfare operation of comparable scale, due to the difficulty of transporting and loading guns and ammunition and the limitation of water transport. This shortage of artillery in initial stages must be made up by naval gunfire and air.

Field artillery must relieve the navy and air of close support missions at the earliest possible time. These arms (the navy and air) do good jobs of neutralizing hostile installations on landing beaches *before* the troops land, and they can and do continue to deliver the goods in support of the troops as they advance; but they can never replace nor even substitute for the field artillery in the speed of delivery of missions nor in the delivery of that very close support so vital to our doughboys. Neither aerial bombs nor naval projectiles were designed to knock out targets within 100 yards of our own ground troops. And yet it is those

targets very close to our own troops that are most vital to our continued advance, and close, effective fire is a very important morale builder. Salerno proved that artillery must get ashore early to provide timely and adequate support to the infantry. The artillery was chiefly instrumental in repulsing strong German attacks shortly after daylight. One division chief of staff went so far as to say that "the beachhead would probably have been destroyed except for early arrival of the field artillery." The same thing happened in Sicily. The 1st Division attributed a big portion of its success at Gala to the early arrival of artillery ashore. So we must get the artillery in early. It is therefore necessary to employ the artillery with greater boldness than in land warfare. But we cannot carry this boldness too far. The beach must be reasonably secure from small-arms fire before the artillery can come ashore. If we can, we will bring our artillery ashore on call, when we know the beach is safe enough. We cannot afford to chance losing our artillery needlessly. Artillery on the beach with only dead men to serve it is of no use to anyone. As demonstrated both at Tarawa and Saipan, the artillery will accept terrific losses when necessary. Due to casualties en route, the 4th Marine Division on Saipan got ashore with enough men to serve only two batteries per battalion by the end of D-day. All artillery from two Marine divisions was ashore and firing by the end of D-day except one 155-mm howitzer battalion, which came ashore the next day. At places, they were as little as fifty yards behind the front lines.

We are going to get ashore as soon, then, as possible, but as I mentioned before, it will probably be at least H plus 2 hours before we can be set up, ready to fire. But the attack has been well under way for two hours. To locate our front lines and avoid firing on them is a serious problem and requires a great deal of coordination. To solve this problem, we set up a series of artillery control lines, short of which no artillery will fire except at specific request of the infantry commanders and beyond which the infantry will not advance before a given time. Wherever possible, these lines should be such that they are readily identified on the ground by both infantry and artillery. It is not intended that these lines determine a rigid, time-table schedule fire. In case the attack is slowed down or stopped, artillery may be adjusted short of the control line by order of the infantry commander through his artillery liaison officer or the field artillery forward observer. Should the infantry advance faster than expected and wish to overrun the control line before the given time, it is the responsibility of the infantry commander to insure that the artillery is notified.

Present artillery doctrine exploits our volume fire technique and teaches that we must have massed fire, that we must have artillery control centralized, that our field artillery battalion is our basic fire unit. For amphibious operations we may be forced to decentralize control. We must be sure that each infantry team will have artillery support. Also, we have to split up our artillery to avoid putting all our eggs in one basket. Artillery batteries must be trained to function independently until the battalion can take control. We do not like it, but we must accept it as an unwelcome necessity. True, we make all arrangements and plans we can to centralize control as soon as possible, but in this type of operation it may be a matter of days. On the African landings, battalions did not gain control of their batteries until the morning of D plus 1 day. The division artillery never did come under centralized control before the fall of Casablanca. Units were too far separated for the division artillery commander to take over control.

In land warfare, our artillery units have with them their full strength of personnel and equipment, and it is amazing the jobs that can be assigned the various cooks and bakers and candlestickmakers besides those given in the Tables of Organization. Equally amazing are the uses to which various pieces

of equipment can be put besides those originally intended. But do not expect to have any of these odds and ends around on an amphibious operation. All units, artillery included, will be cut to the barest combat minimum. It may necessitate the movement of equipment and the laying of wire by hand, the making of reconnaissance on foot, and a lot of other hard work; but I do not believe anyone ever had the idea that amphibious warfare was easy.

Another chief difficulty of the artillery making a landing is that there is almost no chance for survey during the early stages. This means that all firing will have to be observed fire, adjusted by either the ground or air observers. We must be sure, then, that we will have observers where and when the infantry needs them.

That, I believe, covers some of the chief differences between artillery employed in land and in amphibious operations. There are many more, but they are a technical nature and beyond the scope of this article.

With these differences in mind, let us go now to the development of an artillery plan for a hypothetical landing operation.

The development of the plan for the employment of artillery on a landing is like the putting together of a jigsaw puzzle the pieces of which just don't quite fit. We have to round down and smooth the corners of the pieces until they do fit. For example, let us consider just three of the many factors involved. Let us consider (1) the quantity of artillery wanted for the operation, (2) the shipping space available for the artillery, and (3) the organization for combat we desire.

We first consider the operation, the artillery jobs to be done, frontages to be covered, etc., and we say, "Well, we'll need two battalions here and ———— one here ————let's say eight battalions of artillery." All right; we set that piece of the jigsaw down and pick up the next—we go to the navy to see how and where the artillery will load. The naval officer says, "Let's see, how much weight and cubage did you say a battalion required? And how many men? Of course, we've gone through this amphibious planning many times before, so we have the figures readily available. Well, I can put almost a battalion here but only about two-thirds of the men. Will that be OK?" We reluctantly agree. "Then," he goes on, "I can put a battalion here ———— and two here ————; brother, all I can possibly transport is six and a half battalions without whittling some of these other people." We point out that we are willing to whittle a little; surely others can too. After a while we finally agree on seven battalions, all very much whittled.

We have fitted the first two pieces together by smoothing the edges on each. Now we pick up the third piece and the fun begins. We are apt to find that we have loaded one of our much-needed battalions on a supply vessel due in at D plus 8 days. Or we find that the battalion that we wanted in direct support of one of the regiments making the assault is beaching on an entirely different beach. So then we go to the infantry. We swap a little cargo space here for some there. We argue the navy out of more space at the expense of the infantry and continue to smooth corners until finally we get the third jigsaw piece into the puzzle. Now, however, we are very likely to find that we have altered all the pieces quite a little from the original shape. We may now have six battalions instead of the eight we wanted, we probably will not be carrying nearly the amount of equipment with each battalion that we desired, and we may not have the best organization for combat in the world, but at least we have the pieces together—we have something that will work.

Now, in our little analogy, we have considered only three of the problems of the development of our plan and, as in all good jigsaw puzzles, there are many more factors to be considered. Without becoming engrossed in detail, let us consider some of these factors and some of the solutions.

1. Organization for combat.—In organiz-

ing our artillery for combat, we will wish to employ our organic artillery to the maximum and in its normal role, in so far as possible. Therefore our organization will usually follow the normal pattern and we will expect to have a light battalion in direct support of each infantry assault regiment. The remaining organic artillery will normally be in general support, reinforcing the artillery unit supporting the main effort. The division artillery picture will not usually be complicated by the attachment of additional artillery to the division for several reasons. First, of course, is the difficulty of transporting guns and ammunition; and secondly, control of additional artillery units can best be executed by the next higher headquarters, either corps or task force, until such time as the initial beachhead has been established.

2. Equipment.—The artillery has not standardized on the type of equipment to be used for amphibious operations. Each operation has its own peculiarities, and equipment must be selected to conform. Landings in North Africa found the light artillery units equipped with the 75-mm pack howitzer with batteries attached to each battalion landing team. The primary advantage of this weapon is that it can be broken down and loaded into the small landing craft of the leading waves. With the 75, we can provide some artillery support soon after the first waves have cleared the beaches. Also, should the terrain over which we are to operate be rugged and devoid of roads, we know that with the 75 we can provide continuous support for our infantry by breaking down the howitzer and hauling it by hand. Disadvantages of the weapon are its limitations of range and fire power.

Our organic artillery we will have very little chance to change, nor should we have much desire to do so. It may be that we would like to have 105-mm M-7's in place of our towed weapons. We could then land from LCT's with little difficulty. Or we may wish to equip our medium battalion with 105's instead of its 155's for some reason or another. However, one does not just drop a couple of hundred thousand dollars worth of equipment and draw different equipment on desire, and the chances are that we must plan to land with what we have. There are several ways to land 105-mm howitzers. We can land from LCT's or LCM's with our organic transportation as was done in Sicily. Or, as was the practice in the Pacific, we can land our 105-mm battalions from LST's using DUKW's as prime movers, both for the landing and ashore. A DUKW will carry a 105-mm howitzer section complete with a certain amount of ammunition depending on the condition of the sea at the time of landing. If we have heavy swells, we will have to cut down on the amount of ammunition carried; while if the sea is calm, we can load the DUKW more heavily in ammunition.

3. Position areas.—The position areas for all our artillery units will be selected and fully coordinated long before the actual landing. Obviously, we will not have an opportunity to get on the ground and make full reconnaissance before the landing, but we can do the next best thing. We can be assured that our G-2 will provide us with full, up-to-date intelligence summaries and reports. We can also be assured of an adequate supply of air photos, verticals and obliques. From a study of these reports and studies we will almost be able to pinpoint where each artillery piece and installation will go. We did just that in the Sicilian landing. From a study of photos we picked exactly where each installation would go, and that was where they went. However, we must not leave anything to chance nor bank heavily on any single factor, so to insure against failure of our air photo reconnaissance we make sure that reconnaissance parties of each artillery unit land well in advance of that unit to verify our photo reconnaissance and make any changes that need to be made. Another thing we must guard against is the possibility of troops becoming dumbfounded should the navy not land them where they have planned. Troops tend to become so absorbed in just what they

are going to do after the navy puts them ashore at a certain place that they are completely lost if landed somewhere else, and that happens now and then. So we insure that all responsible personnel make a full photo study of the terrain, not only of the locale in which they expect to operate but also of adjacent terrain. In addition, all units will set up what we might term "artillery information centers." These are locations selected where we hope to have our unit command posts. They may or may not end up as command post locations, but we do make sure that some responsible person from the unit gets there. It becomes a place where one may go or with which one may communicate to receive information of the subordinate units of that particular center. Through the information center, we can coordinate any necessary changes in orders or changes in position area should units be landed in spots other than those selected.

Since we will be unable to do any survey work prior to landing, and since maps sufficiently accurate for field artillery firing are not always available, it may be that we will have to use a plain sheet of grid paper as our firing chart initially and make plans to get in a complete division artillery survey as soon as possible. We will tie our survey to the map, and at the earliest convenience we will fire to verify the accuracy of our map. Should it prove accurate for firing purposes, we will be able to fire unobserved fires right away; that is, we will be able to fire with accuracy on targets called for by map location without observation. Should the map not prove accurate, we will have to continue firing on observed targets only.

4. *Observation.*—Thus we see the value of observation for the direction of artillery in landing operations. We must be sure that *all* infantry units be given artillery support; therefore we must be sure all infantry units are furnished artillery observation. We do this in several ways. First, forward observers are landed with the leading infantry elements where they are ready to adjust artillery fire as soon as the artillery is ready to fire. If the infantry unit gets lost or isolated, the forward observers get lost or isolated right along with it. Then, too, before the artillery gets ashore and is ready to fire, the forward observers are valuable in the adjustment of naval gunfire, acting through the naval shore fire-control parties.

Observation parties from each echelon of artillery command are landed well ahead of the artillery to establish observation posts before the artillery is ready to fire.

During the early stages of the landing, our most valuable observation means will be that of air observation. We try, if we can, to load our organic Cub planes either on carriers or on LST's equipped with improvised flight decks or Brodie devices. This was done in Sicily with excellent success. The Cub observer was not only able to keep the force commander informed as to the progress of the landing, but also to adjust naval gunfire on and knock out several important enemy installations.

5. *Transition from naval gunfire to artillery.*—As we begin to land the artillery, and later as this artillery's strength increases, we gradually take over the missions from the naval gunfire and air. This transition stage requires a high degree of cooperation between the field artillery, navy, and air. Plans must be made up complete in every detail, and interlocked one with the others. We do not have space to go into the details, but there is one thing that should be pointed out: These plans must be so complete as to insure flexibility. For example, do not let names fool you and think that the shore fire-control parties are solely for adjustment of naval gunfire, nor that the field artillery forward observers are for artillery only. They are not. *All* observers should be able, and have the communications necessary, to adjust either field artillery or naval gunfire with equal ease. When the direct support artillery fire-direction centers are set up, all these missions should clear through those fire-direction centers.

A further coordinating problem will fall in the artillery's lap in the making of plans

to utilize all possible weapons capable of firing artillery missions. For example, we will normally have a mass of antiaircraft artillery with the early waves, and we need it—landing beaches soon become cluttered up and are juicy targets for hostile air attack. They *must* be protected from such an attack. On the other hand, the antiaircraft weapons will not be firing continuously at hostile aircraft. These weapons are very valuable in their secondary role—reinforcing the artillery. The control of that fire must be with the artillery, so we must make the necessary plans for coordination.

6. Ammunition supply.—One final factor to consider in the development of our plan is that of ammunition supply. Especially during the early stages of the landing, we can expect ammunition supply to be very critical. Artillery ammunition is very bulky, heavy, and hard to handle. We are going to have to husband it carefully and make complete plans for getting it off the beaches to our ammunition dumps as quickly as we can. On the missions we fire, we cannot pop away with ten-volley concentrations at every rabbit that runs out of a hole. We must train our observers to be exacting in their evaluation of targets, we must teach the infantry to call only for those missions really requiring artillery fire, and we must view each mission with a critical eye before firing. After our supply catches up to us we can make a lot of racket, but we have to be careful until it does. A battery without bullets is a sorry sight indeed.

It is realized that in this article, we have hit only some of the high spots of the employment of artillery on amphibious operations. Those points mentioned have been for the purpose of illustrating differences between normal land operation and amphibious operation. Closer analysis shows that in this day of specialized warfare the artillery has been able to keep abreast of the trends and has played a major role in those highly specialized operations — amphibious operations.

Atlantic Battle

From an article in *Britain* (British Information Services) September 1945.

IN the five years and eight months of the European war, 75,000 merchant ships were escorted across the Atlantic by the British, Dominion, and European navies working under British control.

Despite the large number of ships escorted—involving some 2,200 convoys, the largest made up of 167 ships—only 574 ships were lost in all, one in every 131 which sailed.

There were days in the battle when as many as 700 cargo ships were at sea in the Atlantic with 100 warships protecting them.

Of the 2,200 convoys escorted by ships of the Navy, over 1,250 were also covered by shore-based aircraft, Royal Air Force Coastal Command and the Royal Canadian Air Force flying no less than 43,800 sorties.

Over and above these Atlantic commitments, nearly 1,500 merchant ships were escorted by ships and aircraft carriers of the Home Fleet to and from northern Russia; and 173,000 merchant ships were escorted in some 7,700 British coastal convoys. Extensive convoying was also maintained in the Mediterranean and the Indian Ocean.

Four hundred and sixty German U-boats and sixty-five Italian have been sunk by British naval and air forces; in addition to this, from preliminary information obtained from German records and captured officers, some 120 more appear to have been sunk.

The Army Airways Communications System--Party Line of the Air Forces

MAJOR W. A. SMITH, *Air Corps*
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THE big four-engined C-54 slipped out of sight, disappearing just over the roll of a large, fleecy cumulus cloud. A thousand miles of water lay between it and its destination, but never would the pilot and crew be out of contact with the world. As the sky giant thunders through all kinds of weather and draws nearer its destination, it will be in constant touch with the best information available as to weather conditions and traffic. Its navigator will have his position checked by radio fixes of ground stations. Its pilot will be advised as to the best altitude to fly and what to expect all along the route. Finally, after spanning the thousand miles of open water, the airplane settles on to the runway and taxis up to the unloading ramp. The efforts of thousands of individuals have been pointed toward this lone aircraft to insure its safe and timely arrival. But their job, like that of the crew of the airplane, is not done with the end of the flight. Then comes the system of reporting its arrival. The job is not done then. As long as there is an airplane in the sky anywhere in the world, the Army Airways Communications System (AACS) bends every effort toward a successful completion of the mission. This world-wide organization operates radio and wire communications facilities and navigational aids along military airways wherever practicable and necessary in the United States and fifty-two other countries. Weather information transmitted thousands of miles away by units of this agency will affect the plans and flights of aircraft throughout the world.

Aircraft flying from point to point make use of established air routes. It is as though the commerce of the pre-war world had suddenly taken to the air for transportation, so great has been the expansion of air transport operations, both during and after the war.

To utilize these airways, three elements are necessary: first, communications; second, weather information; and third, control. These three elements are like the legs of a three-legged stool; they comprise an inseparable trio, each dependent upon the other. All AACS installations wherever possible have been so arranged to provide the most efficient inter-relation of these three factors. Without weather information, the planes cannot fly safely; without control, chaos would be the result; and without communications, neither weather information nor control would be possible.

In order, therefore, to fit these three elements together so as to be useful, AACS must be a rapid transmission agency for all information needed to move aircraft successfully along the airways. Relatively small in comparison to other organizations in the Army, AACS forms the communications link for thousands of flights daily over the global routes of the Air Transport Command as well as for routine patrol missions where facilities are available.

As such, aeronautical communication is essentially an aid to the pilot, providing safety measures whereby loss of aircraft, equipment, and valuable personnel is prevented, and in addition efficiency in normal aircraft operations is increased. Officially, the mission of AACS is set forth in AR 95-200: "To organize and operate under plans, policies and directives formulated by the Commanding General, Army Air Forces, a communications system along such airways as military traffic justifies, including airways communications, weather communications, airdrome communication facilities, AACS cryptographic sections and message centers where required, and such navigational aids as are considered necessary to provide adequate communication facilities with aircraft in flight and between Army airfields." The underlying purpose of the system is flying in safety.

Being the signal communications organization of the Army Air Forces, it must not be confused with the War Department Signal

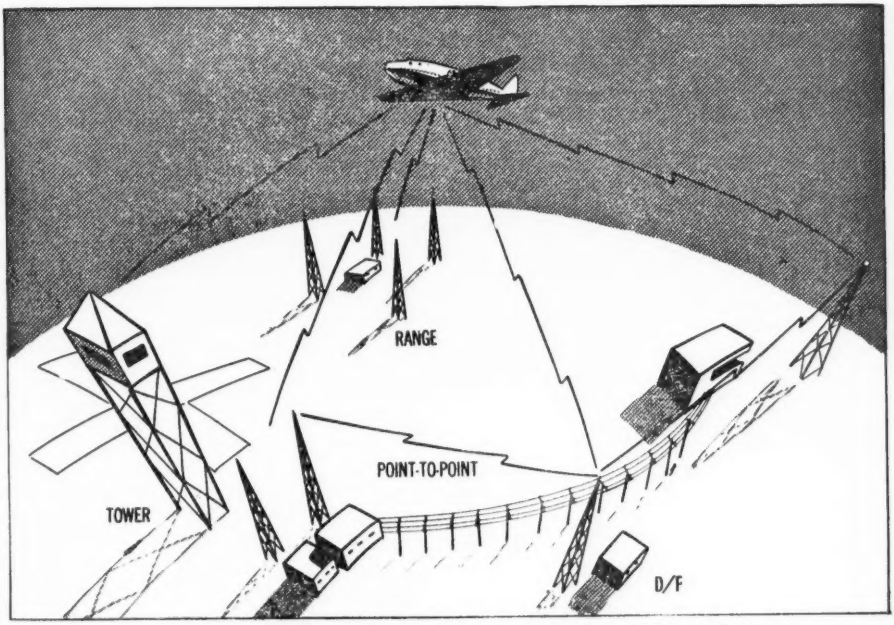
Net. It is primarily an operating organization, not burdened with administration—that being the responsibility of the post, camp, or station to which an AACS unit is assigned.

In providing the communications necessary for flights along the army airways, AACS accomplishes two things: first, it contacts military aircraft to provide information regarding weather, traffic in the air and on the ground, and any other subject that may be requested by pilots. Continuous control of army air traffic is made possible in this manner. Secondly, it maintains contact with point-to-point stations in order to permit the orderly flow of critical traffic.

These are the functions of the greatest interest to the user of AACS facilities, but in addition for AACS personnel there is the establishment and maintenance of these facilities to permit the successful operation of the system. However, AACS personnel are primarily operating personnel and their maintenance responsibility is limited to first and second echelon.

In spite of its tremendous scope and worldwide nature, the Army Airways Communications System is a relatively small organization. In operating over 100,000 miles of its network at the war's end it had but 30,000 individuals on it. Organized into eight wings, each Headquarters largely administrative in nature, its net roughly parallels the routes of the Air Transport Command (ATC). The greatest user of its facilities is the ATC, but AACS is not a part of ATC. Both organizations are on the same command level in the AAF, which is equal to that held by both the overseas and continental air forces. Although the AACS is organized and equipped to serve all the units of the AAF, it is not subordinate to any of them.

Closely paralleling the routes of the Air



This sketch indicates schematically the system operated by the AACS in furtherance of its mission to assist AAF flights.

Transport Command are the services and installations of the AAF Weather Wing. And side by side go the facilities of the AACS. It is the function of the Weather Wing to gather and evaluate weather information, and it is the responsibility of AACS to transmit this weather intelligence to all concerned. However, in isolated regions of the world where it is decided to employ weather reporting stations only, it is often the case that AACS personnel will be charged with the dual function of gathering and transmitting the information.

The AACS organization is very flexible—it must be, to meet the ever-changing situations and because of the variety of services rendered. That it is flexible is most evident in the structure of the detachment, which is the lowest operational unit in the system. This detachment is charged with the operation of the individual station, and its strength varies with the size and nature of the station to which it is assigned. The detachment organization is set up to provide operating services only. The base to which it is assigned is responsible for its rations, quarters, and administration, and therefore it is under the disciplinary control of the commanding officer of the base concerned. Usually the operating personnel are at a bare minimum for efficient operation of the AACS facilities, and for this reason base commanders are discouraged from using these individuals for any duty other than that of operating the communications system. So well have the AACS stations and personnel been integrated into a particular base that few people are aware of the involved chain of command under which it is necessary to conduct their operations.

There are nineteen classes of stations in operation. The class rating of a station is dependent on the type station, the facilities available, and the services rendered. A Class A station is one operating an aeronautical point-to-point and ground-to-air station and a control tower. Generally, its personnel will consist of two commissioned officers and twenty-three enlisted men of whom eight are control tower operators, two are radio mechanics, twelve are radio operators, and one will be a Diesel mechanic. If only the point-to-point and the ground-to-air station is being used, the installation is a Class B station; and where there is a control tower only, it will be designated Class C.

Navigational aids take the form of range stations, fan markers, "Z" markers, D/F (direction finder) stations, and instrument landing systems, among others.

The mission of AACS limits the organization to operating Army airways. This is not to imply that a AACS does not operate in the zone of the interior, for it does. Point-to-point radio or airways stations, control towers, and weather communications are its principal domestic functions. Normally, the operation of range stations within the United States comes under the jurisdiction of the CAA (Civil Aeronautics Authority), and traffic is controlled through its agency known as Airways Traffic Control.*

The Army Airways Communications System is organized and equipped to provide safety in flight for military aircraft and extends its services to all branches of the Armed Forces, whether it be the Army, Navy, or Marine Corps. In order that it may carry on its primary mission with a minimum of interference, no administrative traffic is authorized to be transmitted by it other than that pertaining to AACS itself and to the very closely associated AAF Weather Wing. Of course, in certain areas and under certain conditions, this policy must be deviated from in the interest of expediency. Countless incidents are on record pointing up the resourcefulness of its personnel, often operating in remote and isolated spots throughout the world, who have time and time again provided a measure of assistance to a degree great enough to turn a disaster into a relatively uneventful operation.

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*NOTE: Abbreviated "ATC"; it is often confused with Air Transport Command, also abbreviated "ATC."

Work 'Em and Teach 'Em--Staging AAA Troops in the SWPA

CAPTAIN PAUL CAPRON, JR., *Coast Artillery Corps*
Headquarters, 14th Antiaircraft Command

This article was written while fighting was still in progress in the Pacific.—THE EDITOR.

COLONEL Harry Disston's article in the January 1945 MILITARY REVIEW on the problems of a base commander in the Southwest Pacific Area [SWPA] was read with interest and pleasure by the writer.

The 14th Antiaircraft Command is one of the "customers" Colonel Disston mentioned—one of the biggest, in fact. It operates, in addition to its other multifarious activities, an antiaircraft training center at a Southwest Pacific Base wherein 28,717 antiaircraftsmen have been trained since 1 July 1944, some of them personnel fresh from the States; others, men who had for long been occupying the defenses of remote islands and whose technique needed brushing up. And, because of the exigencies described in Colonel Disston's article, all these troops, or nearly all of them, did their stint as labor troops while they were staging.

Antiaircraft employment in the Pacific is characterized by a sort of seasonal demand. The antiaircraft troops are like the relief pitchers in a baseball game—when you need them, you need them badly; when you don't, they ought to pay to get into the park, unless you can find employment for them outside their normal role. And, like the relief pitcher, the antiaircraftsmen can not be kept too long on the bench or in the bull pen without losing his effectiveness.

Thus a problem in planning is presented to the 14th Antiaircraft Command, a problem which is closely correlated with the problems of the base commanders in the SWPA. It is the purpose of this article to analyze this problem and the solution to it that has been developed in this theater.

This solution, worked out in three years of experience with amphibious operations in the Pacific, is based on the following general pattern into which each operation falls:

First phase: Assault troops establish the beachhead.

Second phase: Ground forces seize an airstrip, their first objective.

Third phase: The airstrip is made operational, and our air force begins to attain local air superiority.

Fourth phase: Air supremacy is gained by our forces.

Fifth phase: Land area conquered, military situation static.

During the first phase, all of the antiaircraft artillery committed to the operation is employed in the aerial defense of the expanding beachhead, shipping, etc.

The second phase sees a sizable proportion of the antiaircraft artillery shifted to the defense of the newly won airstrip; the rest is still employed with the ground forces in air defense.

During the third phase, the antiaircraft protection needed by the ground forces declines steadily, while the airfield and final area defense requirements increase.

At the opening of the fourth phase, only a small portion of the antiaircraft artillery is needed for ground force protection and a somewhat larger proportion for the defense of airstrips and final areas, leaving a considerable balance. In recent operations part of this balance has been employed as terrestrial artillery, and the demand for antiaircraft artillery in this role is steadily increasing as the effectiveness of its fire against targets requiring pinpoint accuracy is demonstrated to ground force commanders. The remainder is available to meet emergency labor requirements.

The system currently applied in the SWPA, when conditions permit, calls for withdrawal, as soon as possible after commencement of the fifth phase, of the AAA units no longer needed to an area where complete facilities are found for training and staging for the

next operation. It is here, at this training center, that the units become the "customers" of the base commander; and it is here also that they furnish a sizable portion of his labor.

This employment, as Colonel Disston pointed out, is not haphazard. The solution outlined in Colonel Disston's article works as satisfactorily from the point of view of the "customer" as it does from the point of view of the base commander. Entire organizations are put to work as units, and they are scheduled as labor for definite periods of brief duration, attempting no training while they are working as service troops. In this way, the troops work under their own officers, whose knowledge of their own men more than makes up for any lack of specialized service branch technique; and the breakdown of morale incident to indefinite employment as labor is avoided. The men recognize the projects on which they are employed as essential, and they know that the labor period is no more than an interim between combat jobs. In consequence, the efficiency of these troops as labor is high, and the labor period, serving as a change, is actually beneficial to them.

After their service as labor, the troops, now over any combat staleness and eager to go, enter an intensive training period of four to five weeks' duration in anticipation of the next operation to which they will be committed. This training is carried on by and through the officers of the units, assisted by the instruction teams of the 14th Antiaircraft Command and the staff of experts at the Command's Training Center. Firing at towed sleeves, target airplanes, and terrestrial targets is heavily stressed during the training, since it has been found that combat firing cannot be considered an adequate substitute for analyzed firing practices in maintaining the high pitch of operational efficiency required by the "shoot to kill" doctrine taught in the Southwest Pacific Area.

The combat-labor-training cycle is continuous in the Southwest Pacific Area. At any one time at the Antiaircraft Command Training Center will be found units on dock details, units on the firing ranges, and units staging for the next operation.

Nor are the training requirements of the units in the area's static defenses neglected. In order to maintain these units at a high level of efficiency so that they are kept available for reemployment, training teams are sent from the Training Center to work with them.

These teams consist of a coordinator who makes arrangements for ranges, secures permission to fire over land and water areas, coordinates missions with the local Air Force and Navy, and in general insures that the training is carried on smoothly; the necessary instruction team—gun, automatic weapons, or searchlight—composed of four officers, experts in guns, directors, etc.; target airplane detachment; a tow-target detachment which furnishes tow-target missions; and the necessary record section. This training team moves as a unit, men, officers, and airplanes, and furnishes approximately the same instruction and firing practice as is given at the Command Training Center. In many cases units are able to conduct practice firing from their tactical emplacements.

Between the Training Center and the training team, the Antiaircraft Command is able to give realistic combat-wise instruction and firing practice to all its units, no matter where located.

The system outlined above has solved the problem of continuous useful employment of antiaircraft artillery troops, and insures constant availability for operational commitment of units trained to the highest peak of efficiency. The record of antiaircraft artillery in the Southwest Pacific Area speaks for itself; in recent operations, more than thirty percent of the enemy aircraft encountered by antiaircraft artillery have been either shot down or damaged.

Night Operations

A report on night operations as executed by the 104th (Timberwolf) Infantry Division.

Included with this article when it was received by the editors were several other illustrations which could not be included here because of space limitations.—THE EDITOR.

1. INTRODUCTION:

a. General.—The 104th (Timberwolf) Infantry Division during its operations in Europe, 23 October 1944—9 May 1945, made over one hundred night attacks. They were all successful, enabling the division to attain its objectives with minimum losses.

b. Training.—Major General Terry Allen constantly stressed night training. During the period December 1943—August 1944 more than twenty-five percent of the division training time was spent on night operations.

2. PURPOSE:

a. To surprise an unprepared enemy.

b. To exploit a successful daylight attack.

c. To gain important terrain preparatory to further offensive operations.

d. To avoid excessive losses which would be incurred by daylight attacks over open terrain in seizing important limited objectives.

a and *d* have been the primary reasons for our night operations since 23 October 1944. To move in daylight over open terrain a distance of 1,000 to 4,000 yards to the forward edge of a town, or to attack over open terrain a strongpoint, would prove costly. Under cover of darkness these operations have proven economical, with negligible or no losses.

3. BASIC ESSENTIALS FOR SUCCESSFUL NIGHT OPERATIONS:

a. Detailed reconnaissance.

(1) By patrolling.

(2) By observation from ground and artillery air observation posts.

(3) Detailed study of maps, air photos, and stereoscopic pairs.

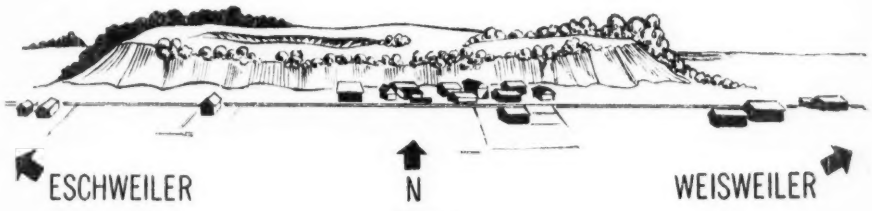

Figure 1.

b. Thorough preparation.

(1) Warning and complete orders issued early.

(2) Briefing of all personnel on the operation by use of ground and air observation posts, photo maps, and photo interpretation maps.

(3) Coordination of all supporting fires.

c. Maintenance of direction and control.

(1) Routes reconnoitered.

(2) Compass bearings taken.

(3) Landmarks carefully located and noted by all personnel.

(4) Advance by bounds; use of phase lines.

(5) Use of white phosphorous shells to designate critical locations.

d. Secrecy.—Operations at night generally are not expected. By careful planning of artillery preparations, surprise will not

necessarily be lost. Night discipline is required—no noise or confusion.

e. Vigorous execution.—Speed, boldness, and aggressiveness are necessary for success.

f. Prompt "buttoning up" of objective.

4. EXAMPLES OF SUCCESSFUL NIGHT OPERATIONS:

EXAMPLE 1

NIGHT ATTACK BY 414TH INFANTRY ON STRONGPOINT (23 NOVEMBER 1944)

1. THE OBJECTIVE.—Slag pile, eighty feet high, 1,000 yards by 1,000 yards, with wooded edges (east of Eschweiler) (see Figure 1).

For one day prior to the attack, the advance had been held up by this strongpoint.

2. PREPARATIONS.—The day before the night of the attack, reconnaissance was made. Exact location of enemy weapons was determined. Infantry supporting weapons were put in position. Mortar and artillery were registered and harassing fires delivered. Exacting fire plans were prepared to support the attack. Orders were oral and fragmentary but complete.

3. DIRECTION AND CONTROL.—The line of departure, which had been secured by a previous attack, was only 200 yards from objective. Objectives were assigned to each squad. Tree line on objective served as guide.

4. CONDUCT OF ATTACK.—Preceded by intensive one-half hour preparation of artillery and infantry supporting weapons, two companies, C on the left, F on the right, each with two platoons abreast, attacked at dusk. Infantry rapidly followed supporting fires at fifty yards. They were on top of enemy before they could come out of holes. Objectives seized in forty-five minutes.

5. RESULTS.—Our losses: three casualties. Enemy losses: ninety-three prisoners of war taken, and large numbers of casualties inflicted on enemy.

6. LESSONS.—Success was due to:

a. Careful reconnaissance.

b. Surprised enemy.

c. Every squad had its direction and objective clearly in mind.

d. Supporting fires carefully coordinated.

e. The assault was vigorously executed.

EXAMPLE 2

NIGHT CROSSING OF MARK RIVER (HOLLAND) (2 NOVEMBER 1944)

1. THE OBJECTIVE.—To force a crossing of Mark River and establish a bridgehead. (Division to make main effort of 1st British Corps.)

2. TERRAIN ANALYSIS. — Standdaarbuiten, the largest town in the bridgehead area, about seventy-five houses, is located on the north bank of the Mark River (see Figure 2). It is the center of a road net which fans out in a northerly direction toward the Maas River, the next major obstacle, approximately 4.5 miles north. The outstanding terrain characteristic of the general area is the system of dikes and network of drainage ditches. The land itself is uniformly flat with little if any slope. The Mark River is a slow-moving stream, approximately fifty feet wide, eight to ten feet deep, flowing northeasterly towards the Maas River. The river line itself was defended by troops and guns in dug-in emplacements along the dike which paralleled the river on the north side.

3. DIVISION PLAN.—Cross with two regiments abreast, 413th Infantry (main effort) on the left, 415th Infantry on the right; 414th Infantry support by fire the attack of 415th Infantry.

4. PREPARATION.—Three days and two nights were spent in preparation of plans and detailed orders and fire plans were issued. Thorough reconnaissance was accomplished by patrols, ground and air observation posts, and map study.

5. DIRECTION AND CONTROL.—Maintenance of direction was simplified by canalization of the terrain which was crisscrossed by parallel lines of dikes. Each dike intersection was numbered, and leaders of all echelons

became thoroughly familiar with them by detailed study of maps and aerial photos. Control was maintained by wire, liaison officers, and radio communication.

6. CONDUCT OF THE ATTACK.—The attack was preceded by one hour preparation of artillery and infantry supporting weapons. The crossing by assault boats commenced at 2100.

a. 413th Infantry. 2d Battalion made initial crossing, completing same at 2124. At 2140 Phase Line "E" was secure. 1st Battalion completed crossing at 2145. At 0007 Phase Line "F" was secure and at 0620 Phase Line "L" was secure.

Results.—Our losses: eighteen casualties. Enemy losses: 113 prisoners of war and casualties.

b. 415th Infantry. Companies K and G made initial crossings. Seized objectives by 2235.

Results.—Our losses: five casualties. Enemy losses: forty-five prisoners of war and casualties.

c. 414th Infantry.—2d Battalion supported by fire the attack of 415th Infantry.

d. Division Engineers.—Class 9 bridge completed at 0115, Class 40 bridge at 1330.

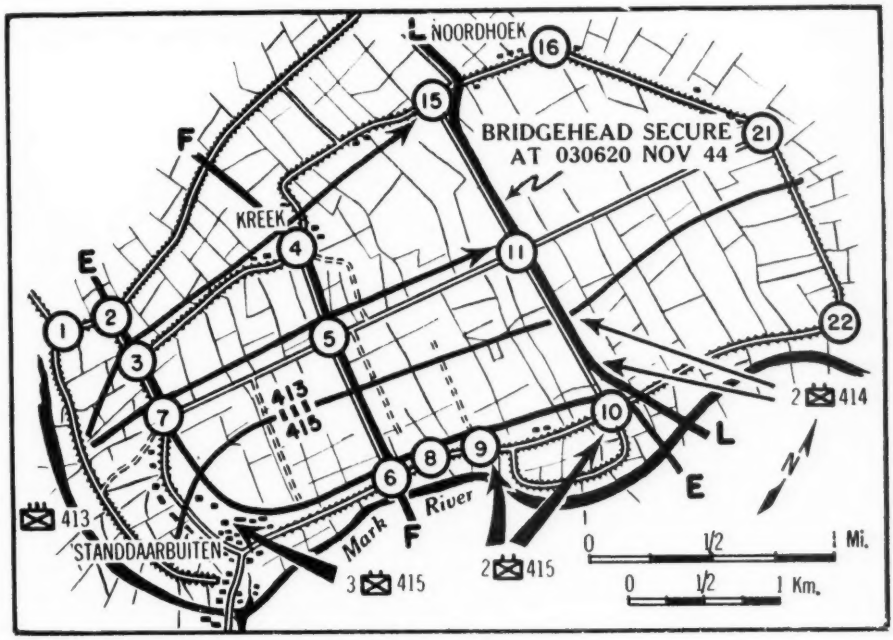

Figure 2.

7. LESSONS.—Success attributed to:

a. Adequate time available for detailed planning and reconnaissance by all echelons of command.

b. Aggressive execution of simple plan.

c. Massed artillery neutralization of critical points coupled with quick follow-up by infantry.

d. Clearly defined objectives.

EXAMPLE 3

NIGHT MOVEMENT OVER OPEN TERRAIN INTO FORTIFIED VILLAGE

1. THE OBJECTIVE.—Merken (see Figure 3), a strongly held town of over 100 houses, 3,200 yards east of Lucherberg. Exposed enemy-held terrain separated the two towns. Pier was still in enemy hands.

2. PREPARATION.—Careful terrain study by key personnel from excellent observation

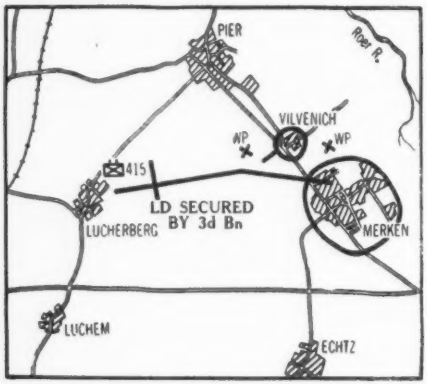

Figure 3.

posts in Lucherberg. Detailed preparation of plans including blow-ups of photo interpretation maps, with each house numbered, was made.

3. DIRECTION AND CONTROL.—Line of departure secured by 3d Battalion, 415th Infantry. Direction maintained by compass bearings supplemented by flanking artillery fire plus planned marking rounds of white phosphorus. Communications facilitated and assured by movement of wire teams with assaulting companies.

4. CONDUCT OF ATTACK.—At 0400 the battalion moved toward the objective in a column of companies echeloned to the left in order B, C, and a reinforced platoon of A Company. The platoon of A was to secure the strongpoint Vilvenich and prevent reinforcement of enemy garrison in Merken from the direction of Pier. Battalion advanced through town with B and C Companies abreast. By 0700 a platoon of A Company had secured Vilvenich and the battalion (-) had a strong hold in Merken. By 1700 Merken was two-thirds reduced. Gains were consolidated and remainder of town secured on following day.

5. RESULTS.—

a. Our losses: three casualties.

b. Enemy losses: 160 prisoners of war and over 100 casualties. Four antitank guns, two self-propelled weapons, fifteen machine guns, and large stores of ammunition and mines were captured.

c. Three thousand two hundred yards of open terrain studded with enemy outposts were crossed at night without casualties.

d. Complete surprise was obtained, evidenced by platoon Company A seizing seventy-eight prisoners at Vilvenich in bed and in process of dressing.

EXAMPLE 4

NIGHT ATTACKS EAST OF THE ROER RIVER (24-26 FEBRUARY 1945)

MAPS: Germany, 1:25,000, Düren, Buir sheets (5104, 5105) (see Figure 4).

1. TERRAIN ANALYSIS.—The ridge line (Ellen-Merzenich) dominated the Roer River. The towns of Ellen, Arnoldsweiler, Merzenich, and the Rath Castle (all within the corps objective) and Morschenich and Golzheim (three miles beyond the corps objective) were all heavily fortified and defended. The terrain was open and gently rolling except for the above-mentioned ridge line. Fields of fire were excellent.

2. SITUATION AND PLAN OF ATTACK.—The division had forced a crossing of the Roer River 230300A February and had advanced to the line shown on Operations Map by 241800A after heavy fighting. The 413th Infantry and 415th Infantry were in position and the 414th Infantry was completing its movement from west banks of Roer River, closing in the north part of Düren. The 413th Infantry was to attack at 242100A

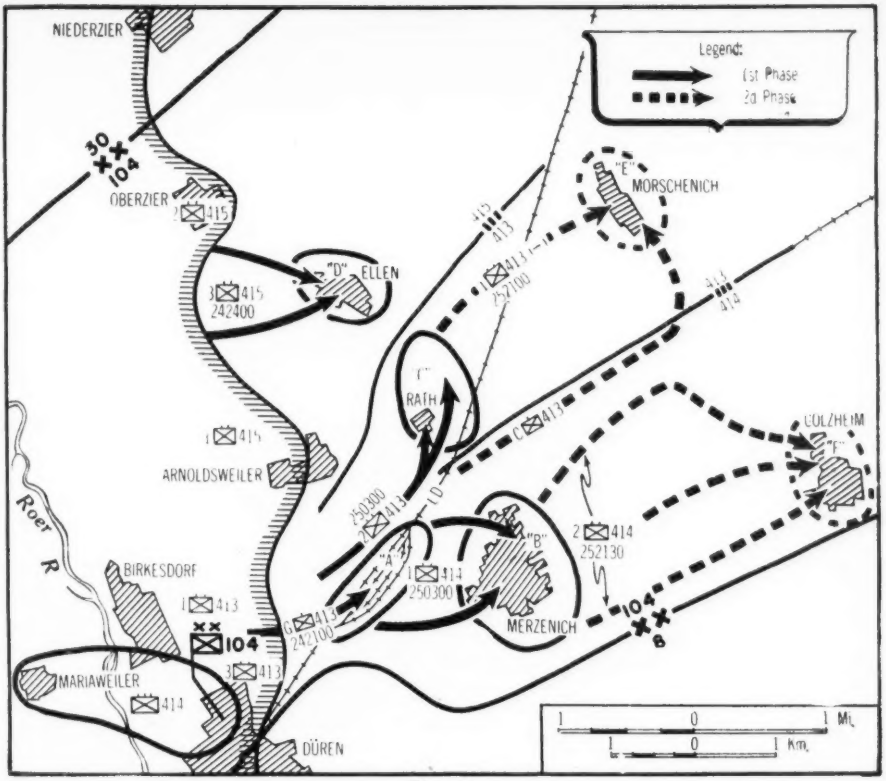

Figure 4.

and seize Objective "A" prior to 250200A, and to attack at 250300A to seize Objective "C." The 414th Infantry was to pass through 413th Infantry elements at Objective "A" and attack at 250300A to seize Objective "B." The 415th Infantry was to attack at 242400A to seize Objective "D." On 25 February, 413th Infantry and 414th Infantry were to attack at 2100A and seize Objective "E" and "F" prior to 260600A, when 3d Armored Division would pass through to exploit the success. This scheme of attack required the highest degree of coordination.

3. PREPARATION FOR ATTACK.—Reconnaissance by observation and maximum use of aerial photos and photo interpretation maps enabled all personnel to be thoroughly familiar with the terrain and enemy defenses.

4. THE ATTACK:

PHASE 1

a. Company G, 413th Infantry attached under cover of darkness at 242100A and seized Objective "A," large marshalling yards east of Düren, by 242245A. The line of departure for the 414th Infantry had been secured.

b. At midnight (242400), three miles to the north, the 3d Battalion, 415th Infantry, reinforced by a platoon of tanks and a platoon of tank destroyers, launched its attack on Ellen, Objective "D"—clearing it at 250800A.

c. 2d Battalion, 413th Infantry (less Company G holding Objective "A"), passed to the north of the marshalling yards at 250300A and attacked Objective "C," seizing it at 250700A.

d. Also at 250300A, the 1st Battalion, 414th Infantry, attacked, passing through the marshalling yards seized by Company G, 413th Infantry. By 251230A it held Merzenich, Objective "B."

e. By 251050A, 1st Battalion, 415th Infantry, had cleared Arnoldsweiler.

x. Results.—The corps bridgehead was firmly held by the division as of 251230A, the night operations having netted three enemy fortress cities, over 750 prisoners of war, and a great quantity of weapons, ammunition, and supplies, at a cost of only twenty-seven casualties.

PHASE 2

a. 1st Battalion, 413th Infantry, attacked at 251200A—seizing Morschenich, Objective "E," at 260545A. A converging night attack—infantry.

b. 2d Battalion, 414th Infantry, reinforced with a company of tanks and a company of tank destroyers (self-propelled), attacked at 252100A—seizing Golzheim, Objective "F," at 260300A. A converging night attack—tanks and infantry.

x. Results.—Two regimental commanders, three battalion commanders, and 511 enlisted men were captured and great quantities of weapons, ammunition, and other supplies were taken. Our casualties: fourteen.

5. LESSONS

a. By constant pressure on the enemy with day and *night* attacks, defense will be broken. Phase 2 completely caught the enemy by surprise and fully unprepared for defense. The German regimental commanders were captured at Morschenich while discussing plans for the defense. At Golzheim most of the 244 prisoners were caught asleep.

b. Employment of tanks and tank destroyers (self-propelled) at night proved very successful. In the attack on Golzheim two companies of infantry were mounted on a company of tanks and a company of tank destroyers. The advance on the town was made over three routes. When 200-300 yards short of the town, the armor brought direct fire on the objective for fifteen minutes. The infantry dismounted and moved into the town immediately after the fire lifted. Artillery fired on the city commencing at 2130. In addition to keeping the enemy in the basements, it also served to give direction to the attack, as there were occasional rounds of white phosphorus interspersed with high explosives.

c. Advance over open terrain with excellent fields of fire must be made at night to avoid excessive losses. In this operation an advance of five miles, netting the seizure of five fortress cities and the capture of 1,266 prisoners of war and large quantities of hostile weapons, ammunition, and supplies, was accomplished quickly with losses of only forty-one men.

EXAMPLE 5

NIGHT ATTACK BY 415TH INFANTRY ON LUCHERBERG (2 DECEMBER 1944)

MAPS: Germany, 1:25,000, Düren, Sheet 5104 (see Figure 5).

1. TERRAIN ANALYSIS.—Lucherberg, a town of about fifty houses, is located on high ground, elevation 500 feet, dominating the surrounding terrain and overlooking the Roer River. All-around protection was provided by an elaborate, well planned system of trenches. To advance on Lucherberg it was first necessary to cross the fast-flowing twenty-foot wide Inde River. The river was fordable to foot troops only.

2. SITUATION.—The estimated strength of the force in and around Lucherberg at this time was about 500-600 infantry with several tanks. Plenty of enemy artillery was in evidence. The 414th Infantry was to seize the part of Inden east of Inde River. The 1st Division was to attack at daylight, 3 Decem-

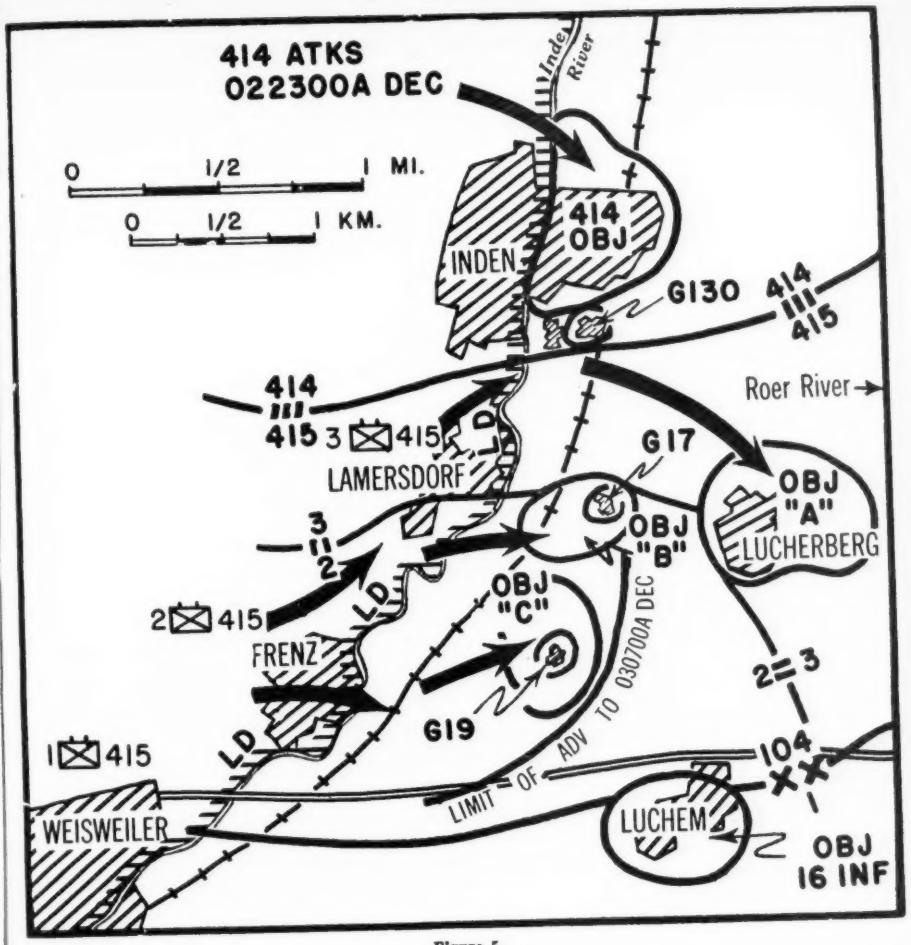

Figure 5.

ber, on our south and take Luchem. The 415th Infantry was to take Lucherberg. At this time, the 415th Infantry had the 3d Battalion in Lamersdorf, the 2d Battalion in Frenz, and the 1st Battalion in Weisweiler.

3. PREPARATION FOR THE ATTACK.—All men were thoroughly briefed in the part they were to play in this operation. Adequate supply of air photos was available and a detailed study of them was made. Officers and noncommissioned officers continually studied the terrain from observation posts. Company and platoon leaders studied the terrain from artillery observation planes.

4. PLAN OF ATTACK.—The 415th Infantry was to attack with the 3d Battalion on the north in a narrow zone, the 2d Battalion on the south in a much wider zone. The 2d Battalion was to attack at 2300, 2 December, with two companies abreast with the

mission of securing the factory at G17 and securing the strongpoint at G19. The 3d Battalion was to move at 2400 with companies in column directly on Lucherberg. Both battalions were to mop up in their respective areas at daylight. The 104th Division Artillery, augmented by fire from the VII Corps, 30th and 1st Division Artillery, supported this attack. Additional fire was also provided by all the infantry weapons, attached tanks, tank destroyers, and antiaircraft artillery. Several corps artillery TOT's [time on target] were placed on the enemy position before the final preparation. The final preparation lasted from H minus 60 to H minus 5. All available fire was then lifted to areas that would prevent the enemy from reinforcing Lucherberg. I Company, which had the most important mission of breaking into Lucherberg first, had attached one section from M Company (carrying light machine guns in lieu of heavy machine guns), two bazooka teams from the battalion antitank platoon, an artillery forward observer and team, and a forward observer from M Company. Each platoon had a "fire squad" consisting of men armed with burp guns and grenades. Each platoon carried ten antitank mines. The switchboard was set up at Inden and each platoon was to lay 130 wire. Two extra 300 sets were carried. I Company was to attack in column of platoons.

5. THE ATTACK.—The 2d Battalion jumped off at 2300, G Company fording the river at Lamersdorf and E Company at Frenz. Both companies followed the artillery closely and were successful in getting near their objective before discovery. E Company was successful in mopping up G19 in short order, but it was not until 1200, 3 December, that G Company had complete control of the factory area. At 2300, a reinforced platoon of L Company planked the railroad bridge to make a crossing available for I Company. It then took up positions at G130 to secure the crossing of I Company. I Company crossed without incident at 2400 and started for Lucherberg, selecting the steepest and most difficult terrain approach. Half-way to the objective, the now-alert enemy opened fire with several machine guns. Realizing that surprise was lost, a rush was made for Lucherberg. The "fire squads" were brought to the front and actually shot their way forward with a mass of fire. Two and a half platoons reached the objective, but the rest of I Company was prevented by deadly enemy fire from continuing the advance. This was true of L Company which, in the plan, was to follow I Company. I Company secured a toehold of six buildings on the northwest edge of Lucherberg. This was held under terrific odds until contact was regained.

In the advance of I Company, the artillery radio and two 300 sets were destroyed by enemy fire, leaving one 300 set available for use. This radio was the only means of communication that the company had for some time and actually "saved the day" when used to call for artillery fire. It being impossible for L Company to advance, the company was brought back to Lamersdorf and at 1200 was successful in crossing the river and joining up with G Company which was still held up in the factory area. F Company forded the Inde in the afternoon, joined up with L Company in the factory area, and at 1500, L and F made a coordinated attack on Lucherberg. At 1630, L Company made contact with I Company. Soon after, F Company gained the south edge of Lucherberg and the three companies mopped up remaining enemy resistance and immediately organized the town for all-around defense. Despite two heavy counterattacks consisting of enemy infantry and armor, the town was firmly held.

6. RESULTS (Includes casualties suffered 3-4 December during counterattack.)

a. Our losses: twenty-five killed, eighty-nine wounded, twenty-one missing.

b. Enemy losses: 204 killed, 209 prisoners of war, two Tiger tanks, two Panther tanks, one self-propelled gun, five 75-mm antitank guns, and vast stores of ammunition.

c. The enemy force in Lucherberg, 2 December 1944, consisted of some 500 to

600 men of the 3d Paratroop Division. The surprise and the strength of the night attack made by the 415th Infantry was clearly demonstrated by the statement of one prisoner of war of the 10th Company, 8th Paratroop Regiment. "We didn't know we were being attacked until grenades dropped in our foxholes," he stated as most of what remained of his company were being interrogated at the regimental prisoner of war cage.

The loss of Lucherberg was greatly felt by the enemy as was evident by a report that General Model himself (Commander in Chief in the West) had been in Düren and had personally ordered the recapture of the town.

7. NIGHT FIGHTING LESSONS BROUGHT OUT

a. In most cases artillery preparation is advisable.

b. Line of departure must be secured by troops other than those making the main attack.

c. When surprise is lost, aggressive, fast action is necessary.

d. When there is doubt of antitank guns being brought up soon, mines and additional bazookas must be carried.

e. Thorough briefing and reconnaissance of all types are necessary.

f. Additional communication is vital—especially radios.

Practice What We Preach

Digested at the Command and General Staff School from an article by Colonel William F. Coleman in *Marine Corps Gazette.*

FROM time immemorial military men and schools have preached the gospel of brevity, simplicity, and directness in the matter of preparing orders or plans. And yet there must be something wrong some place because the available records of amphibious operations conducted during the war indicate that the ideas taught so religiously in schools were constantly and flagrantly violated in actual practice. Orders for a division operation were two or more inches thick, and regimental orders reached awe-inspiring proportions. The net result was that a recipient of such a voluminous set of orders or plans was inclined to marvel at the industry of the headquarters which compiled them but certainly displayed a decided disinclination to start digesting this mass of miscellaneous information to find out what it was all about. The remedial steps to be taken to reduce the volume of our orders basically amount to a common-sense application of the teachings expounded by our schools and service manuals and include the following:

1. Be brief, yet complete. Give orders clearly, specifically, and without circumlocution.

2. Distinguish between *vital* information and instructions which the troops must have, and merely *interesting* information which can in no way influence the action or plans of the troops. Give lower units only what they must have.

3. SOP's can obviate much order writing. Where SOP's exist, give units credit for carrying out the instructions contained therein and do not repeat these instructions in orders.

4. Remember that orders and annexes for operations are not training programs and must not contain directives for training.

5. Issue orders through the proper chain of command. Tell each subordinate echelon *what* it is to do, but let it determine *how* to do it.

6. Constant briefing of troops and staffs on the situation will keep everyone informed in general terms and eliminate the need for much writing. There is much to be said for the way a commander so often starts his orders in school problems, viz., "You are familiar with the situation."

7. Overcome the idea that orders must cover every minute detail in order to preserve a record. War diaries and special action reports form sufficient records.

Postwar Policy for Training of Combined Services Operational and Planning Staffs

AIR COMMODORE H. E. NOWELL, *Royal Air Force*

"And they all with one accord
began to speak with one voice."

IN the light of the United Nations Charter, it is possible to look ahead to the achievement of one of the fundamental objectives for which all free nations united in World War II—the removal, for all time, of the threat of world aggression by any power or group of powers.

The collapse of Facist Italy, the unconditional surrender of Nazi Germany, and the defeat of Japan were due to the absolute preponderance of all classes of war matériel in the hands of the Allied forces on sea, on land, and in the air; controlled by a unified system of command unique in the annals of history.

Never before have the resources and the manpower of so many nations been welded together by one common purpose and with such success. In the production of munitions, as in the planning and command of operations, the United Nations have combined to achieve and maintain the maximum of effort against the common enemies of the civilized world.

If the San Francisco Charter is to prove the cornerstone for the building of lasting security and world peace, it is essential that the proven lessons of cooperation and coordination be studied and developed.

The war has given us a new conception of the expression "Combined Operations" and has re-emphasized the necessity to train commanders and staff officers of all services on the broadest inter-service lines.

Before the historic 1942-1943 campaign in North Africa, combined operations were regarded as highly specialized amphibious operations with air support, involving comparatively small total forces of the order of the raids on St. Nazaire and Dieppe. The British pre-war "Manual of Combined Operations" described in great detail the training, preparation, and organization required for such raids, and attempted to bridge the diversities of individual service approach to the problems of coordinated operations. It was, in effect, an inter-service dictionary of military terms and practices. So great and fundamental were the differences between the systems of training, organization, and communication in the sea, land, and air services, that such a dictionary was a vital necessity for the smallest scale combined operation.

Total war has proved that all modern operations are, and must be, combined operations—combined in the sense of inter-Allied as well as of inter-service cooperation. The total military, industrial, scientific, and political resources of all participating Allies have been husbanded to the common cause of achieving complete victory in the shortest possible time, and the second World War has established the practicability of combined operations on the widest scale. The final conquest of North Africa followed the most carefully planned and brilliantly executed combined operation of history to date, and led to the development of the highly successful Allied command and staff teamwork which has since been applied to the final overthrow of Nazi Germany.

Until the dissolution of SHAEF [Supreme Headquarters Allied Expeditionary Force] in July, General Eisenhower was at the head of the world's most representative machine of combined military command, and his success in France and Germany was largely due to the foundation of teamwork laid in Tripoli, Tunis, and Italy. The foundation was not laid without difficulty. Wide differences of individual service and national systems had to be resolved; personalities had to be adjusted, and a navigable middle course discovered and steered before success was achieved. The degree of success in the Mediterranean and in Central Europe is proof that the Allied commanders have learned

the real lessons of combined operations. For the future, it will be necessary to insure that those lessons are not forgotten and that our postwar policies for the training of officers of all arms will provide the only foundation on which combined operations can be built. This will entail radical changes from prewar standards and systems.

It is not proposed to discuss here the possibilities or the advisability of amalgamating the sea, land, and air forces of individual countries under single Ministries of Defense, though this is likely to be a fruitful source of discussion in most important countries. The purpose of this paper is to suggest a system of staff training by which officers of separate services may best be fitted for staff and command appointments in the national or international forces of the future.

The Pre-War Position

Before the war each of the three British services trained its own staff officers, and the proportion so trained was all too small to provide the nucleus requird for the rapid large-scale expansion of the services which began after the Munich Conference in 1938. Furthermore, staff officers were trained as specialists in their own service, and little emphasis was laid on the combined services aspect, in any of the Staff Colleges. Only at the Imperial Defense College (IDC) did senior officers of all three services meet to discuss the problems of combined planning and operations. The general shortage of officers in September 1939 made it necessary to close the IDC and to reduce the length of courses at the Staff Colleges. Opportunities for combined staff study were thus still further reduced, and it remained only for the necessary experience to be gained in the actual process of battle, wherein time and tide wait for no man. The overall coordinated success of Allied operations since El Alamein proves that we have the right staff material for training, and that combined operations—in the widest possible sense—are as practicable as they are essential in modern total warfare.

There is no substitute for time, and we cannot afford to waste time in war while officers make up the leeway in inter-service knowledge and experience caused by insufficient basic training. A sound knowledge of the potentialities, requirements, and limitations of all services on the part of all members of combined staffs is essential to the speed and success of war. Sound planning and efficient execution of operations is impossible unless commanders have at their disposal staff officers of all arms and services trained to a uniform staff procedure and with a thorough knowledge of all services.

Suggestions for the Future

With the object of insuring that the future staff officer shall have a comprehensive training, fitting him for employment on any combined operational staff, the first essential is to standardize the system and details of staff procedure in all three services. This will involve a thorough overhaul of existing systems of staff duties and signals procedures, and the evolution of common practices which in themselves will greatly simplify the earlier stages of training. It will be quite impossible to design courses of inter-service staff instruction until many of the present fundamental differences are resolved, and the three services can speak a common language.

When unification of staff procedure has been achieved, it will be a comparatively simple and straightforward matter to evolve suitable courses of instruction for officers of all services. It is suggested that the instruction should be divided into three main phases, the first of which will be devoted to basic training in staff duties and in the general principles of organization applicable to the three services and to the civilian departments concerned in total war. This phase might last for three months, and should be followed by a period of three to four months applied to specialized training in individual service organization and tactical development. The foundation of common staff duties procedure and specialized service knowledge thus laid would serve as a basis for the third

phase which should last for one year, during which officers of all three services would study together the strategical and tactical aspects of total war. The syllabus of this final phase should include instruction in the effect and importance of science, economics, industry, and propaganda in modern warfare.

Throughout the eighteen to nineteen months' course students should be trained and encouraged to discuss and to write upon inter-service subjects. Lectures, individual and syndicate exercises, and discussions would be included in all phases. In Phase One the exercises would be on staff duties; those in Phase Two on problems specially applicable to individual services; and in Phase Three students in syndicates would be given exercises embodying all aspects of total war planning. Every officer would be taught in Phase Three to handle sea, land, and air problems with equal facility.

The overall aim should be to develop the Staff courses on a university basis, and to give the maximum possible freedom of expression to the individual.

Postgraduate Training and Application

In the opinion of the writer, two of the outstanding defects of the British pre-war staff training system were:

a. The proportion of officers selected for training was far too small.

b. Very little opportunity was provided for organized postgraduate study or for practical application of the principles taught at Service Staff Colleges.

Staff training should be an open book for all officers rather than a mystic society of a small minority. Furthermore, the book should be in several volumes to be studied in turn throughout the service career. Thus only will it be possible to insure that all services are commanded and staffed by officers fully abreast of the evolution and development of all aspects of modern warfare, and capable of successful control of combined operations.

In any organization of international forces which may develop as a result of the San Francisco Charter, it is equally important that commanders and staff officers of participating Powers are trained to understand and appreciate the organization and training methods of the services of other countries with whom they are likely to come into working contact. For this reason, it is to be hoped that, in the postwar period, there will be a freedom of interchange of ideas and some uniform system of planning and training which will insure that in the unhappy event of combined military action again becoming necessary, the machinery of organization, planning, and command will be ready at the outset to work as smoothly and effectively as it did after trial and adjustment in World War II.

A final judgment should never be rendered upon an officer until he has been observed under conditions resembling somewhat those of the battlefield. A well-disciplined and smartly-dressed unit is a primary indication of a good leader, but the true test comes when an accident occurs, an unforeseen danger threatens, or some unusual effort is required.

—From an article by Major Couchepin in *Revue Militaire Suisse*

Logistical Support of an Amphibious Operation--Communications Zone

LIEUTENANT COLONEL J. R. MCILROY, *Field Artillery*
Instructor, Command and General Staff School

GENERAL SITUATION

1. You are the Assistant Chief of Staff, G-4, Communications Zone. During the past year a base has been built up in Luzon to support operations against the Japanese on the Asiatic mainland and particularly to support a proposed amphibious operation against the Japanese islands. Additional support will be rendered from bases in the Marianas and outlying islands, as well as direct shipment from the Zone of Interior.

2. It is now D minus 60, D-day being the date of first landings on the Japanese island of ----------. The Theater Commander has called a conference to discuss the logistical situation. You attend this conference as representative of the Commanding General, Communications Zone. Also represented by their G-4 and A-4, respectively, are the Commanding Generals of the ---------- Army and the ----------Air Force as well as Allied and Naval representatives.

3. The Theater Commander states that there is some doubt as to whether the number of assault divisions is sufficient to make the landing successful, and would like to add two more divisions in the assault phase. He adds that he is aware of the logistical problems this change entails, and asks whether or not the accelerated build-up can be supported. Although this support will fall directly on the task force commander during the early stages, the Communications Zone will be involved on the near shore(s) throughout the operation and on the far shore as soon as an army rear boundary is drawn. You are therefore concerned with the problem of supporting the operation in all its aspects.

4. Detailed computations have been made to determine that the operation as originally planned *could* be supported. you are requested to adjust those computations to the new build-up and render a report within forty-eight hours.

SPECIAL SITUATION

5. Returning to your office, you find a mass of information is already available, having been compiled by the technical services and other agencies in compliance with the original theater planning directive. That directive laid down a few fundamental logistical factors, in addition to setting forth the tactical plan.

These factors included:

a. Troop build-up.
b. Shipping allocated.
c. Prescribed build-up of reserves (supplies).
d. Maintenance factors (lbs/man day).

6. Based on these factors and a study of the lodgment area, your headquarters has estimated and computed:

a. Service troops required.
b. Tonnages of supplies to be landed daily.
c. Transportation required.
d. Near and far shore port and beach capacities.
e. Near and far shore inland road, rail, and water transportation capacities.
f. Installations required.

7. Detailed plans have been prepared to cover activities and responsibilities of the Communications Zone up to D plus 90. Tentative plans have been completed up to D plus 195. As the proposed change in tactical troop build-up does not affect previously conceived plans after D plus 90, you are at present concerned only with plans up to D plus 90. You have the Army Plan before you, as well as the Communications Zone Plan.

8. It is evident that the proposed change in the troop list will affect practically every detail of the two plans. It is impossible to rewrite these plans in the time available. It is equally impossible to recompute all of the detailed tables of supply and transportation requirements. You must rely on

planning factors to provide the answer to the question: *Can you support the operation?*

9. What are the factors which determine the answer to this question? You make a list, noting at once that they fall roughly into two categories, capacity factors and requirement factors; these terms you define as follows:

a. Capacity factors: *What you can do.* What you have with which to do it. Limitations on your ability to do it. Capabilities. *How it can be done.*

b. Requirement factors: *The job to be done.* The forces or agencies for whom it is to be done. When and where it is to be done. *How it should be done.*

You tabulate the factors as shown in the table below (Figure 1):

CAPACITY FACTORS	REQUIREMENT FACTORS
1. Supplies—availability *a.* On hand *b.* Expected to be received by time needed	1. Troops to be supported *a.* Numbers *b.* Types *c.* How equipped
2. Troops—availability *a.* Service troops and labor (including civilians) (1) On hand (2) Expected	2. Maintenance factors (tons or lbs/man/day) *a.* For each major type of troop unit *b.* For special groups: Navy, allies, prisoners, hospital patients, etc.
3. Transportation—physical capacity *a.* Near shore (1) Inland road, rail and water (2) Port and beach *b.* At sea—shipping *c.* Far shore (1) Port and beach (2) Inland road, rail, and water *d.* Air—daily tonnage from -------- to -------- *e.* Pipelines	3. Reserves—prescribed build-up: *a.* For each major component *b.* Where to be located *c.* When levels are to be attained
4. Installations—physical capacity *a.* Number, type, location *b.* Capacity *c.* Rate of turnover	4. Tactical *a.* Phase lines—timetable—rate of advance *b.* Terrain—effect of expenditure of: (1) POL (2) Ammunition (3) Equipment (4) Personnel

Figure 1.

10. It is now evident that the answer to the question, "Can you support the operation?" depends on whether or not *capacity* (what you can do) *equals or exceeds requirements* (the job to be done). It is therefore vitally important to understand the exact relationship between these factors, and to reduce that relationship, insofar as possible, to precise mathematical terms. The problem which follows illustrates this relationship.

a. First you find that all of the capacity factors can be consolidated into one, the "limiting factor" or bottleneck. This you call the *output capacity*—the quantity of supplies which can be delivered to the using troops after passing through all the intermediate steps or bottlenecks. This output capacity is measured in tons per day.

b. The requirement factors can be reduced to three: Troops to be supported, measured in numbers of men; the overall maintenance factor, measured in tons/man/day; and the level of supply prescribed, measured in days of supply.

c. To sum up, you decide to use the following letters to designate the factors (variables) under consideration:

D=the first day of the operation or phase on which the estimate is based.

Y=the last day of the phase concerning on which you wish to make the estimate (D plus Y days).

C=the output capacity, expressed in tons, cumulative to and including the given day Y.

F=average maintenance factor (tons/man/day) applicable to the period, troops, and operation under consideration.

M=maintenance tonnage (cumulative to and including the given day Y).

T=troops to be supported on the given day Y.

L=overall level of supply (in days of supply) on the given day Y.

R=reserve tonnage (cumulative to and including the given day Y).

d. Now suppose you wish to determine the number of tons of supply (cumulative) which are *required* by a given date (D plus Y). You can calculate this by substituting actual values for the letters given for the factors above (T, F, and L). Obviously this required tonnage cannot exceed the cumulative tonnage capacity (C). How to equate all of these things?

11. You take maintenance first. Assume you are building up troops at the rate of 100 men per day, and each man requires F-tons per day maintenance. What is the total maintenance to be delivered by D plus 10? The table below (Figure 2) shows how you arrive at the answer:

Day (*D*+*Y*)	*Troop Increment*	*Total Troops* (*T*)=	*Maintenance* (*F*) *per day* (*F*×*T*)=	*Cumulative Maintenance Requirement* (*M*)=
D	100	100	100 F	100 F
D+1	100	200	200 F	300 F
D+2	100	300	300 F	600 F
D+3	100	400	400 F	1000 F
D+4	100	500	500 F	1500 F
D+5	100	600	600 F	2100 F
D+6	100	700	700 F	2800 F
D+7	100	800	800 F	3600 F
D+8	100	900	900 F	4500 F
D+9	100	1000	1000 F	5500 F
D+10	100	1100	1100 F	6600 F

Figure 2.

By inspection, the total maintenance tonnage (M) to be delivered by D plus 10 is 6600 F. What is the relationship between Y, the number of days after D-day, and this total maintenance tonnage, which you have designated as M? Graphically, it appears somewhat as in Figure 3. In this figure the area

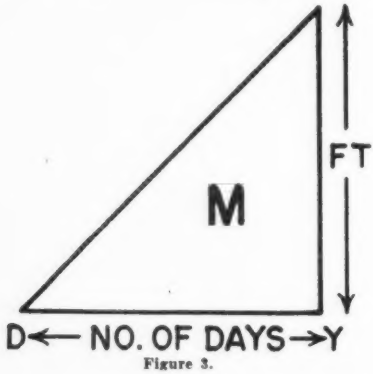

Figure 3.

of the triangle (M) represents cumulative consumption from D to Y. The horizontal line represents the number of days. The vertical line represents daily consumption (men x tons/man/day). Thus you see that:

$$M = \frac{FT \times \text{No. of Days}}{2}$$

Translated, this means that:

The cumulative maintenance tonnage (M) is one-half the maintenance factor (F) x the cumulative troop strength x the number of days involved. How many days are involved (from D to Y inclusive)?

If Y is D+10, you have 11 days consumption. But you must bring in each day the maintenance for the next. Therefore you have to deliver on D+10 the supplies for D+11, which is the twelfth day of consumption. Therefore the number of days involved is Y+2.

Thus you find that:

$$M = \frac{FT\,(Y+2)}{2}$$

Substituting values from Figure 2 in this formula, you find that it checks.

12. Having determined the relationship between cumulative maintenance, troops, and the maintenance factor, what about reserves? It has been assumed that the level of supply for any given date (Y) is designated as the letter "L," in days of supply. Letting "R" equal the total tonnage of reserves on any given day (Y), you find that:

$$R = LFT$$

In other words, the total tonnage of reserves on a given day is the product of three factors: (a) the level for the day (in days of supply), (b) the maintenance factor (in tons per man per day), and (c) the number of men to be maintained on that day.

13. You now have a value for M (cumulative maintenance tonnage) and a value for R (accumulated reserve tonnage). For any one day the total of these two must equal the entire tonnage of supplies (exclusive of T/E [Tables of Equipment]) delivered to date. Since you are attempting to limit this tonnage to the cumulative capacity (C), it becomes obvious that:

$$C \text{ must equal } M \text{ plus } R$$

Substituting the values derived in paragraphs 11 and 12, you find that:

$$C = \frac{(Y+2)\,FT}{2} + LFT$$

or:

$$C = FT\left(\frac{Y+2}{2} + L\right)$$

14. Now that you have managed to equate these variables, what does it mean? It means simply this: If you know the maintenance factor, the troop strength, and the desired level of supply, you can determine the capacity required simply by substituting the known, prescribed, or estimated values in the above formula.

15. The next step is now clear: By inverting the formula, you can solve for any of the variables. Thus you find that:

$$T = \frac{C}{F\left(\frac{Y+2}{2}+L\right)}$$

$$F = \frac{C}{T\left(\frac{Y+2}{2}+L\right)}$$

$$L = \frac{C}{FT} - \frac{Y+2}{2}$$

Translated into plain English, you can use these formulas as follows:

Given any three of the variables for any given day (Y), you can derive the fourth:

a. Given the maintenance factor (F), troop strength (T), and level of supply (L), you can determine the *capacity required* (C).

b. Given the maintenance factor (F), troop strength (T), and capacity (C), you can determine the *level of supply (build-up) attainable* (L).

c. Given the maintenance factor (F), level of supply (L), and capacity (C), you can determine the number of *troops supportable* (T).

d. Given the level of supply (L), capacity (C), and troop strength (T), you can determine the average maintenance factor (F) *attainable* for the period.

Derivation of Factors

16. One of the most difficult tasks in this type of logistical planning is obtaining the basic data in a workable form. A vast amount of information and estimated data are available, but these must be examined carefully to determine whether they can be used in the formula.

17. *Capacity*: As previously stated, regardless of the number of factors affecting your ability to move supplies and troops, one factor alone is important: the *output* capacity—the quantities which can be delivered at the point of usage. Making allowances for that portion of the port and beach capacity, inland transportation, shipping, etc., which must be reserved for moving troops and equipment, you find a net amount which can be used for supplies, which you tabulate on a cumulative basis for the first ninety days of the operation as in Figure 4.

18. *Personnel Supported*: A troop basis is available, and you modify this to include the two additional divisions and supporting troops which the Theater Commander has

PRESCRIBED OR GIVEN FACTORS

Day (Y)	*Maintenance Factor (F)*	*Troops (T)*	*Reserves (L)*	*Capacity (C)*
	Tons/man/day	*Men (Cuml)*	*Days of Supply*	*Tons (Cuml)*
D+5	.035	100,000	5	35,000
D+10	.035	150,000	7	100,000
D+15	.035	225,000	10	200,000
D+20	.035	300,000	14	300,000
D+30	.035	500,000	20	650,000
D+40	.035	650,000	25	900,000
D+60	.035	800,000	35	1,500,000
D+90	.035	1,100,000	45	3,000,000

Figure 4.

decided to add in the assault phase. The cumulative troops list is shown in Figure 4.

19. *Maintenance Factors*: Experience data for the theater are available for each service and class of supply. You go over this carefully to determine which factors must be modified to fit this operation, tabulating your results in Figure 4.

20. *Reserves*: The build-up for all classes of supply has been prescribed. You find, however, that the rate of build-up varies for some classes. You find it necessary to weight the prescribed levels in these cases by converting all reserves to tonnages, (L x F x T), using the appropriate maintenance factors and troop basis for each level and date. These tonnages, totaled, can then be converted back to overall days of supply, which you list in Figure 4.

Application of Formula

21. Using the factors derived and listed in Figure 4, you apply the formulae in paragraph 15 to determine whether or not the factors are in balance. In other words, you assume that all the factors except the one sought are as shown in Figure 4. By applying the formula you can determine the other. For example: Suppose you wish to determine the number of troops supportable (T) at D plus 20. You find that the application formula is:

$$T = \frac{C}{F\left(\frac{Y+2}{2} + L\right)}$$

In Figure 4 you find the following values for D plus 20:

F=.035 tons/man/day
L=14 days of supply
C=300,000 tons
Y=20

Therefore:

$$T = \frac{300{,}000}{.035\left(\frac{20+2}{2} + 14\right)} = \frac{300{,}000}{.035 \times 25} = 343{,}000$$

This is not the value for T given in Figure 4 for D plus 20 (300,000). Obviously, therefore, you can support more troops (at this date) than you planned to use. In order to distinguish between the prescribed factors and those derived from the formulae, you designate the letter by the suffix (1). You tabulate the factors as follows:

Factor	*Prescribed or Given*	*Attainable or Required*
Troops	T	T_1
Level of Supply	L	L_1
Maintenance Factor	F	F_1
Capacity	C	C_1

ATTAINABLE OR REQUIRED FACTORS

Day (Y_1)	*Attainable Maintenance Factor* (F_1)	*Supportable Troops* (T_1)	*Attainable Reserves* (L_1)	*Required Capacity* (C_1)
	Tons/man/day	*Men (Cuml)*	*Days of Supply*	*Tons (Cuml)*
D+5	.041	117,500	6.5	30,000
D+10	.051	220,000	13	68,000
D+15	.048	308,000	17	146,000
D+20	.04	343,000	18	263,000
D+30	.036	516,000	21	630,000
D+40	.03	558,000	19	1,045,000
D+60	.028	652,000	23	1,850,000
D+90	.025	940,000	32	3,500,000

Figure 5.

22. By applying the factors in Figure 4 in the formulae derived in paragraph 11, we obtain the complete picture on attainable or required factors. These are shown in

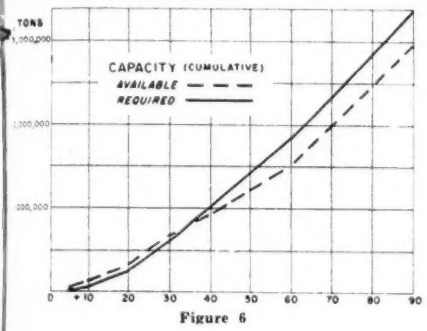

Figure 6

Figure 5. Figures 6, 7, 8, and 9 show graphically how the prescribed and attainable factors compare.

Conclusions

23. From an examination of Figures 6, 7, 8, and 9, it is clear that the operation can be

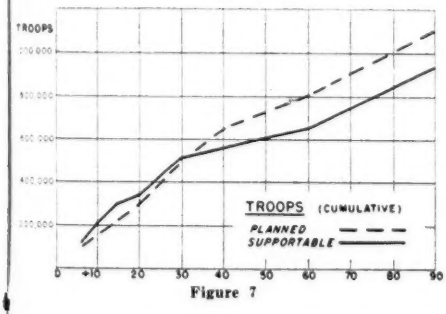

Figure 7

supported during the first thirty-two days. After that time it will be necessary to revise your plans. Four alternatives are open:

a. Increase capacity for moving the supplies.

b. Decrease the troop build-up.

c. Decrease the supply build-up (reserves).

d. Decrease the maintenance factors.

After some deliberation you decide to recommend no change in the factors other than the prescribed build-up. Figure 8 indicates that reserves ashore will decrease from

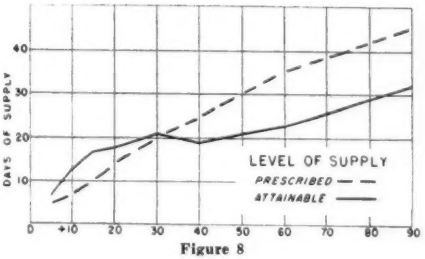

Figure 8

twenty-one days of supply at D plus 30 to nineteen days of supply at D plus 40, after which the level will slowly rise again to thirty-two days at D plus 90. Considering

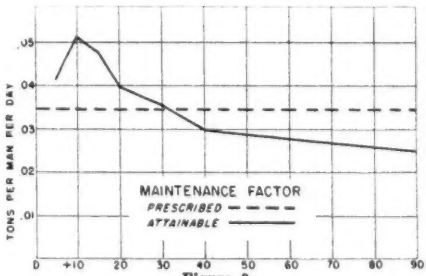

Figure 9

the amphibious nature of the operation, you feel that this is not too heavy a margin on which to work, but, with convoys arriving every ten days, you hope to get by.

Not a step without reconnaissance!

—A Red Army motto.

Engineer Support

LIEUTENANT COLONEL A. E. McCOLLAM, *Corps of Engineers*
Commanding Officer, 305th Engineer Combat Battalion

This battalion landed in France 6 August 1944 and participated in the breakthrough and pursuit through France, the closing of the Falaise Gap, the crossing of the Marne, Moselle, and other streams, the breaching of the Maginot Line at St. Avold, the Battle of the Ardennes, the breaching of the Siegfried Line, the crossing of the Rhine, and the pursuit to Chemnitz.—THE EDITOR.

AS commanding officer of a divisional engineer battalion during training and combat, I have had ample opportunity to study the problem of engineer assistance to the troops of an infantry division. In the following discussion I shall endeavor to present the results of this experience and that of my officers in our attempt to solve this problem. The question of support to elements of the division other than infantry, such as artillery, will not be discussed since the work performed for the infantry will in almost every case meet the demands of other units in the division.

METHODS OF SUPPORT

During the course of the past few months of combat in the European Theater of Operations under all conditions of terrain and weather, the following methods of engineer support have been tried:

1. A platoon of each engineer company attached to each infantry regiment.

2. A company attached to each regiment.

3. A company in support of each committed regiment.

4. A compromise method: A platoon of each company always attached to each regiment. When the remainder of the engineer company is in support, the platoon reverts to control of the engineer company.

5. A company in support with the mine platoon of infantry antitank company attached to the supporting engineer company.

6. Engineer battalion in general support.

ADVANTAGES AND DISADVANTAGES

All of the above methods have been tried in practically every type of combat, and the following advantages and disadvantages have been noted. No attempt will be made here to discuss the mechanism or means of operation.

1. Platoon attached to each regiment.—This method results in almost every case in insufficient engineer assistance to the regiment. Lack of adequate heavy equipment, especially the bulldozer, lack of adequate liaison to the regiment, and the lack of an experienced adviser to the regimental commanding officer on engineer matters are among the principal disadvantages. The platoon is often overworked, rations not properly cared for, and the platoon is sometimes ordered by infantry staffs to perform tasks having little or no bearing on engineer capabilities or the real engineer necessities of the situation. A typical example comes to mind. During the crossing of the Moselle River, when the division was not too securely established on the far shore, one of the infantry commanders ordered the attached platoon to take a hill which was defended by an estimated enemy company. Had this order been carried through, the platoon would undoubtedly have suffered heavy casualties and valuable, highly-trained technicians would have been lost for the extensive mine work found shortly thereafter. Another grave disadvantage is that the platoon of an uncommitted regiment is not available for engineer work. In effect, the division engineer has lost a third of his entire working force.

2. Company attached to each regiment.—Many of the disadvantages of the platoon method are overcome here. In a normal situation two regiments of a division are committed. The company attached to the uncommitted regiment is not available to the division engineer and much valuable time is

lost while the division engineer goes through the laborious process of getting one company released from attachment. Even when all three regiments of the division are committed, the amount of engineer work in each regimental sector is seldom equal, so that one of the companies may be overworked and need reinforcement while the other two companies have only part of their companies committed. Again the disadvantages of having the attached company committed unnecessarily as infantry while needed engineer work is neglected is encountered.

Occasionally, attached companies are put on such jobs as improvement of the regimental command post while other more necessary engineer work is neglected. Unless the attachment is disregarded with respect to supply and administration, these vital functions become a real headache to the company commander. The attachment of a company to a regimental combat team is only advantageous when the combat team is committed at great distance from the remainder of the division.

3. Company in support of each committed regiment.—This method has proved to be extremely flexible and the most economical under all conditions except a detached regiment. Supply and administration are unquestionably the responsibility of the battalion. The division engineer is given ample opportunity to shift his troops and assign work areas in accordance with work demands. If the work is particularly heavy in one regimental sector, the supporting company can be readily reinforced by elements of the uncommitted company. Even when all three regiments are committed, the inequality of work demands can easily be met by the shifting of men and equipment. We encountered no situation except that of a detached regiment where this method did not result in all-around greater efficiency in the employment of engineer troops.

4. Company in support—mine platoon attached.—An inauguration which has proved its value time and time again is the attachment by the regiment of the antitank company mine platoon of a committed regiment to the engineer company in support. The engineer company adviser to the regimental commanding officer is made responsible for all mine road clearance in the regimental sector, and on those occasions when it is necessary to have an engineer platoon with each infantry battalion the mine platoon can be committed and the engineer company commanding officer will still have a reserve of one platoon for emergencies. This method is even more advantageous than the company in support.

5. Platoon attached except when company in support.—This method is essentially the same as that of a company in support. Only one disadvantage over the company support method exists. When a regiment is uncommitted, the platoon attached to that regiment is not available to the engineer company which will normally be reinforcing the committed regiments, and a third of his force is idle.

6. Engineer battalion in general support.—This method results in all calls for engineer work coming through the engineer battalion headquarters. It gives maximum freedom and flexibility to the division engineer but results in lack of close liaison to the regiments and resultant slowing down in the tempo of answers to work calls.

RECOMMENDATIONS

Considering all factors, it is believed that an engineer company should be in support of each committed regiment in all situations, and the mine platoon of the antitank company should be attached. The only exception is that of a detached regiment, and in this situation the regiment should have a full company attached.

The Staff Estimate of the Operations Situation

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Instructor, Command and General Staff School

IN all types of military operations a commander may at any time call upon the members of his staff to give him their estimates of the situation. Contained in these estimates will be the information which he desires to assist him in making his own estimate and arriving at a decision.

In order to assist staff officers, our Field Manuals contain certain forms which may be used in the preparation of their estimates. It has been rather a common practice to state that the G-3 will use the Form for the Commander's Estimate in the preparation of his own estimate. This form, however, does not contain all the essential items needed by the G-3 and does contain certain items with which he has no concern in preparing his estimate. In order to render the maximum assistance to the G-3, it is believed that some form which does contain these essential items and will lead him through a logical thought process is necessary. Such a form is shown below. It is felt, however, that the G-3 of a division will seldom make a written estimate when called upon by the commander to submit his recommendations. Time permitting, he may do so, but ordinarily his estimate will consist of a few notes which he will present orally to the commander, based on this form.

FORM FOR A STAFF ESTIMATE OF THE OPERATIONS SITUATION

Issuing unit:
Place:
Hour and date:

Maps:

1. MISSION
   The objective to be attained
2. SITUATION
   a. Enemy (shown on overlay or map)
   b. Our own situation
      (1) Present disposition of major elements of the command
         (a) Front-line units
         (b) Reserves (local)
         (c) Supporting and adjacent troops and air cooperation
         (d) Reinforcements including replacements
      (2) Combat efficiency of major organic elements of the command
         (a) Strength
         (b) Training
         (c) Fatigue
         (d) Morale (aggressive spirit)
         (e) Status of supply and equipment
   c. Terrain (general)
      (1) Observation
      (2) Fields of fire
      (3) Cover and concealment
      (4) Obstacles
      (5) Routes of communications
   d. Weather (general)
3. POSSIBLE LINES OF ACTION
   State the line or lines of action which will accomplish the mission
4. COMPARISON OF POSSIBLE LINES OF ACTION
   a. Analyze each of the possible lines of action stated in Paragraph 3 above by considering the advantages and disadvantages of each as affected by the following factors:
      (1) Enemy
         (a) Front lines (extent, depth, and amount of organization of the ground)
         (b) Location of artillery
         (c) Location and strength of reserves
         (d) Air activity
      (2) Our own dispositions
         (a) Front-line units
         (b) Reserves (local)
         (c) Artillery
         (d) Supporting and adjacent troops and air cooperation
         (e) Possible reinforcements, including replacements

(i) Type
(ii) Location
(iii) Strength
(iv) Availability

(f) Terrain
(i) Observation
(ii) Fields of fire
(iii) Cover and concealment
(iv) Obstacles (natural and artificial)
(v) Trafficability (cross country)

(g) Roads and bridges
(i) Number
(ii) Type
(iii) Condition
(iv) Trafficability

(h) Weather and season
Effect on: troop movement, air cooperation, observation, supply, and signal communication

(i) Time and space
(i) Hours of daylight and darkness
(ii) Time required for troop movement

(j) Control and signal communication
(i) Distances
(ii) Facilities
(iii) Interferences

b. Compare the advantages and disadvantages of each possible line of action.

5. CONCLUSION

State the line of action recommended for adoption, as a result of consideration made in 4 above.

Let us carefully analyze this form. The heading is believed to be self-explanatory. The maps used, of course, would be those needed for reference in the estimate and normally will be the situation map or an exact copy thereof.

In Paragraph 1, the mission of the unit as a whole is stated. The mission is the actuating factor for any estimate. It has been placed in Paragraph 1 to be sure that the G-3 will have it clearly in mind before he commences his estimate. It is the primary thought from which he should work.

Paragraph 2 has been labeled "Situation." It has been subdivided into four subparagraphs: the location of opposing enemy forces, the present disposition and combat efficiency of our own command, terrain, and weather. The enemy situation will normally be shown on the situation map. In his preliminary estimate prior to the decision, G-3 will consider what the enemy is doing and what he is capable of doing at the time that estimate is being prepared. Our own situation has been subdivided into two parts, the present disposition of the major elements of the command and the combat efficiency of those elements. Our dispositions will normally be shown on the situation map and will be the dispositions as of the hour the estimate is made. In figuring the combat efficiency of the major elements, the G-3 will have to coordinate closely with other staff members. A report to the commander is needed which will indicate, by weighing the factors listed above, whether or not the command can carry out the mission assigned.

In considering the terrain under Paragraph 2, the G-3 does so in a general manner. He is particularly interested in the five factors listed as they apply to the whole area over which the unit might have to operate. Later on in his estimate he will apply these factors to particular portions of the terrain.

The same applies to the weather. In this paragraph he considers the weather as it might affect the operation as a whole, how it will affect the accomplishment of the mission which has been assigned.

Under Paragraph 3, G-3 makes a statement of those lines of action which, if successful, will accomplish the mission. If in his study of all the factors listed in Paragraph 2 above, he finds only one such line of action, he can immediately proceed to the last paragraph of the estimate, the conclusion. It will be a rare occasion, however, when there will only be one line of action open which will accomplish the mission.

Under Paragraph 4, G-3 takes each line

of action and analyzes it by considering the advantages and disadvantages of each as affected by the factors listed in this paragraph. Whereas analysis of the factors listed in Paragraph 1 was of a general nature, under this paragraph G-3 analyzes each of these factors as they affect each line of action which is open to our forces. When he has done this, he must then make a comparison of the advantages and disadvantages of each line of action with the advantages and disadvantages of the other lines of action.

Having completed this comparison, G-3 is then ready to come to a conclusion in Paragraph 5 as to the line of action which he will recommend to the commander as the best which can be adopted to accomplish the assigned mission.

The Battle In The Channel

From a British source.

THE naval war in the English Channel was fought out by the "little ships" of the Royal Navy and the German Navy for five continuous years.

Naval actions in the Channel in these "little ships" were fast and furious. They were high-speed actions fought often at forty knots (nearly fifty miles per hour) and at night. It was a war of stealth and sudden action. Officers and men had to be highly trained and able to make instant decisions.

The E-boat was the German equivalent of the British MTB (motor torpedo boat) or American PT-boat. It carried two torpedoes and a light armament, and its prey was the coastal shipping moving up and down the Channel. The E-boat held the initiative in the early stages around 1940 but very soon was on the defensive and seldom looked for an engagement with the British MTB's. Forty-eight E-boats were sunk during the five years and many others were severely damaged.

MTB's formed the protection for the large convoys converging on the Normandy beaches on D-day. Many times E-boats endeavored to break through this cordon to attack Allied shipping, but seldom succeeded.

Beginning with only two flotillas, the MTB's increased a hundredfold and finally employed 25,000 officers and men. They bottled up the E-boats in their own harbors, and in cooperation with the Royal Air Force Coastal Command virtually brought German coastal shipping to a standstill.

A Correction

IN an article by Colonel Conrad H. Lanza entitled "Strategical Aspects of the Final Campaigns Against Germany" in the August 1945 number of the MILITARY REVIEW, an account was given on page 10 of "Operations of the Western Allies from 16 March to 15 April."

Colonel Lanza states that the Third Army has since furnished information indicating an error in the account of its operations. In the second paragraph, the sentence "On 29 March the Allied right attacked . . ." should read as follows:

"On the right, the German defense against the advance of the Third Army in the Rhine-Moselle sector had disintegrated. About four German divisions collapsed, and had lost 40,000 prisoners. The Third Army reached the Rhine, and made an initial crossing by one division on 23 March. On the 25th, 26th, and 28th, three additional divisions forced crossings, and the army advanced east and northeast."

MILITARY NOTES AROUND THE WORLD

GREAT BRITAIN

Rocket-Propelled Bombs:

Some details of a new Allied weapon—a rocket-propelled bomb—were announced in a joint statement by the British Admiralty and the United States Strategic Air Forces in Europe.

In order to penetrate specially protected U-boat shelters and explode a charge inside, it was considered necessary to use a "power bomb." The Admiralty, in cooperation with the Ministry of Supply and other departments, therefore designed a weapon using rocket gear as the propulsion unit.

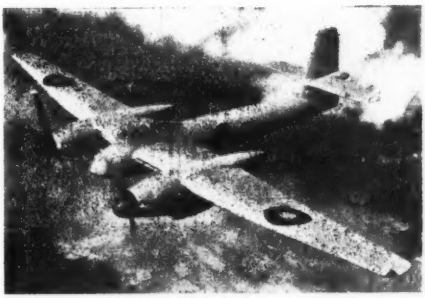
Initial plans gave the bomb a striking speed greater than that of sound. Tests made with prototypes showed that the rocket bomb maintained perfect stability from release to strike. Production in Britain of the new weapon was then given priority.

The new bombs were used by Flying Fortresses against S-boat pens at Ijmuiden on 10 February and 14 March. It is known that several hit and pierced the massive roofs of the pens and are believed to have caused considerable damage inside. The bomb strikes its target at a speed of more than 1,100 feet a second. It is carried at normal flying altitude and aimed by the usual sighting technique.

(*The Times*, London)

New Stratosphere Fighter:

One of Britain's newest aircraft is the Westland Welkin single-seat stratosphere fighter, which has been designed to combat the menace of the high-flying raider. With a wing-span of seventy feet, it is the largest of the single-seat fighters now in production. Its total weight is 17,500 pounds. It is powered by two Rolls-Royce Merlin engines, each developing 1,650 horsepower; at height it maintains its great power by means of a



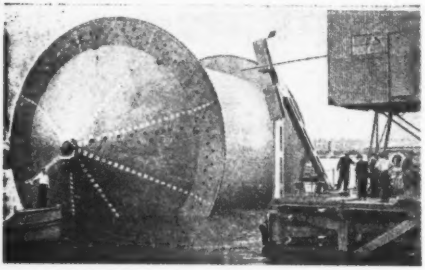
two-stage, two-speed supercharger. Its speed is 384 miles per hour, its range about 1,500 miles, and it carries four 20-mm cannons. Air pressure in its armored cabin is automatically regulated by a robot valve, needing no attention from the pilot. Clouding of the wind-screen by ice or mist, which would be inevitable at the height at which the Welkin flies, has been overcome by the pumping of a layer of warm air between the double layers of glazing which form the pressure-resisting surface of the coupe. This warm-air layer also keeps the cockpit so warm that even at temperatures of minus seventy-eight degrees Fahrenheit no special clothing is needed.

(*The Sphere*, Great Britain)

Drum for Channel Pipeline:

The picture below shows one of the great floating steel drums used to lay the pipelines under the English Channel which supplied the Anglo-American armies in Europe with gasoline.

The pipelines were composed of twenty-foot lengths of three-inch diameter steel pipe which could be welded automatically into any length and could be wound onto a drum like thread on a spool, if the drum



were thirty or more feet in diameter. A floating drum was developed capable of carrying the whole length of pipe needed to cross the Channel. The drum was towed by tugs, paying off the pipe as it went. Ninety feet long and more than fifty feet in diameter overall, the drum weighed 1,600 tons when fully wound. It could carry seventy miles of pipeline. The drum around which the pipe was wound was forty feet in diameter and sixty feet long.

(British Information Services.
British Official Photo.)

Invasion of England:

Documents discovered in Berlin show that the Germans were preparing in the fall of 1940 to strike at south and southeast England with twenty-two divisions and with seventeen more divisions in reserve.

The initial attack was to be launched by the German Ninth and Sixteenth Armies, forming Army Group A. The Sixteenth was to sail from Ostend, Dunkirk, Calais, Boulogne, and the mouth of the Somme River, and was to land on the Kentish coast between Margate and Hastings. The Ninth was to leave Dieppe, Le Havre, and Caen and hit the British coast between Portsmouth and Brighton.

Airborne landings were planned north of the Romney Marshes, between Folkestone and Hastings.

Army Group B, made up of the enlarged German Sixth Army, was to follow these initial thrusts by sailing from Cherbourg for Bournemouth on Weymouth Bay.

Landing forces of the two army groups were to comprise eleven infantry and two mountain divisions, with a mobile force of six armored, one SS, and two motorized divisions.

Reserves were to total nine infantry divisions and eight additional infantry divisions which were to be available from general headquarters reserves.

The plan called for two beachheads of Army Group A to link up.

The Germans apparently hoped to smash British and Canadian defenders in the hedgerow country of Kent, Sussex, and Surrey and then drive on to the second objective, a line from Colchester on the east to the mouth of the Severn and north of Bristol on the west.

The Nazis hoped to cut off London and send mobile forces through to occupy important coastal towns and industrial towns in the midlands.

The documents disclosed that the earliest top-secret order from German headquarters to the Sixteenth Army was sent on 17 August 1940. No D-day was specified.

If the Germans had launched their invasion it was likely they would have employed a force for the landings about the same in strength as the Allies used in Normandy on D-day. The Nazis had thirteen divisions earmarked for the actual landing operation, along with airborne forces totaling probably a division and a half. About nine divisions probably would have gone ashore the first day.

For the first few days after the projected Nazi D-day, the Germans would have hurled in about three more divisions.

(From a news release)

The "Scissor" Bridgelaying Tank:

Figure 1.

Figure 2.

During the war the British developed several types of tanks designed to carry and lay their own bridges. Operated by crews within the tanks, the bridges could be laid under fire and used for crossing antitank ditches, small streams, concrete emplacements, and other obstacles.

One type of bridgelayer is the "Scissor" tank. The pictures above and to the right show successive stages in the unfolding of the scissor-type bridge, which is carried on top of a Valentine tank and is operated automatically.

(British Official Photo)

Figure 3.

POLAND

The Polish Air Force:

When the Nazis crashed into Poland, they went with 4,550 airplanes, while the Poles had 426. They shot down 131 of the Germans, but they themselves lost 114. After the autumn campaign the surviving Poles flew to France, and after the fall of France they came to Britain, where during the Battle of Britain two entirely Polish fighter squadrons greatly distinguished themselves. They became renowned for their fast take-offs, as well as their fine formation flying, which was adopted from the start by U.S. airmen.

As early as 1941, all the Polish squadrons flew Spitfires. Afterwards, their night squadron did excellent work with twin-motor Beaufighters and their tenth squadron was furnished with Mosquitoes. The Polish Mustang Wing took part in U.S. raids over Germany. Polish bombers dropped 26,159,000 pounds of bombs and mines on assigned targets.

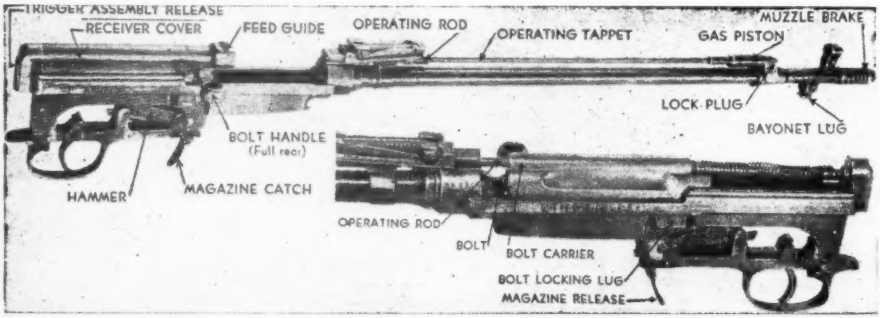
(*The Aeroplane*, Great Britain)

U. S. S. R.

Tokarev 40—The Russian "Garand":

From an engineering and design standpoint, no semiautomatic rifle in use in the world today excels the Russian Tokarev 40. From the standpoint of finish it is inferior to United States and German rifles of its class, but it embodies simple and intelligent engineering principles and manufacturing short cuts to a degree unknown in any other current semiautomatic rifle.

At the upper left of the picture below the rifle is shown with bolt open and minus only the wooden stock, metal operating rod cover, and magazine. This rifle is fitted with a muzzle brake of high efficiency. Under actual test, this type of brake reduces recoil about forty percent! This unit, together with the bayonet lug, forms part of the gas-piston assembly. Driving out the locking lug below the piston permits the entire unit to be removed easily by unscrewing from the barrel. Note that the front sight is hooded.



The short gas cylinder (into which passes the gas escaping through the gas port in the barrel) directs the gas back against the piston which floats over the cylinder. A small external nut is provided which can be turned to give four different degrees of gas release, either to speed up the operating rate or to relieve sluggishness without having to clean a fouled cylinder.

The floating piston drives back the long operating tappet which is seated in the short operating rod, driving the rod back through a hole in the receiver above the barrel to unlock and push the bolt straight back to eject, cock, and reload.

The magazine is a detachable box of ten-shot capacity normally, though the capacity is dependent entirely on the length of the staggered box. The magazine catch may be folded back under the trigger guard assembly when not needed. To remove the magazine it is necessary only to grasp it with the hand and compress the catch with the thumb of the same hand.

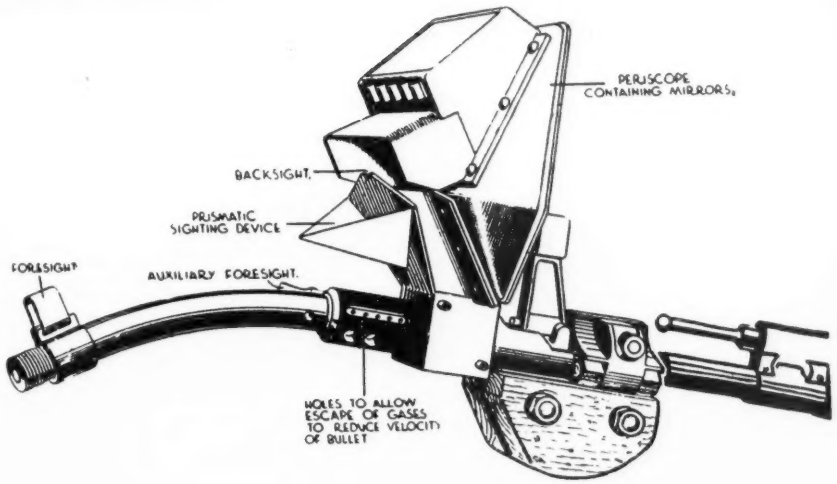
In the photograph (lower right) a clear conception is given of how the operating rod is driven back to start the bolt carrier back. As pressure drops, surfaces machined in the carrier and in the bolt cause the carrier to pick up and unlock the bolt by forcing it up a cam face; thence, the whole assembly travels back in straight line.

To sum up, the Russians have developed a rifle which is simple to use, clean, and repair—which has been engineered on the soundest mechanical principles of straight-line operation—with a minimum of small or breakable parts; a rifle capable of being manufactured with simple machine facilities at probably the lowest unit cost of any semi-automatic rifle so far.

(Digested from an article by W. H. B. Smith in *The American Rifleman*)

GERMANY

Curved-Barrel Carbine:

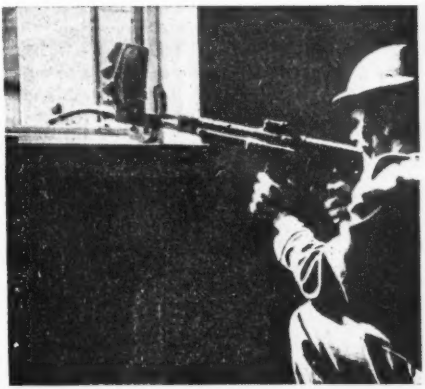


"The gun that fires around corners" has arrived. The curved-barrel German machine carbine pictured on this page can be fired at targets invisible to the rifleman by a design which swings the bullet through an angle of thirty-two degrees.

Produced too late for effective use on the Western Front, a few unused specimens issued to forward German troops were captured by the British and flown over for testing by experts who, at first inclined to scoff, have now admitted that the weapon is very effective at short ranges up to about one hundred yards.

In aiming the weapon, the rifleman "sights" his target via a mirrored-periscope attachment, whose vital feature is a prismatic "corrector."

When the rifleman presses the trigger, a small explosive charge forces the bullet up the straight barrel to the curved section, where escape holes for the explosive gases reduce the velocity of the bullet as it swings through the curve, to emerge from a short muzzle, which re-corrects its curve to a straight line of flight.



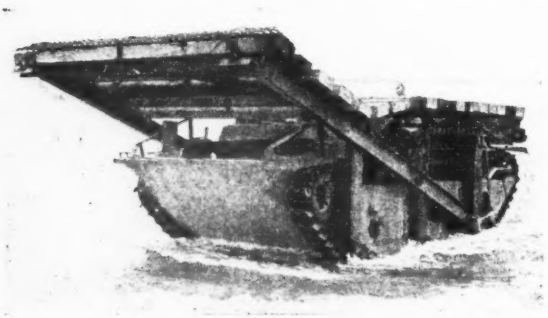
The photograph shows how this novel weapon can be used to fire from a window on troops in the street below, while the rifleman himself is under complete cover.

(*The Illustrated London News*, by courtesy of the British Army magazine *Soldier*)

UNITED STATES

Ramp-laying LVT:

A "secret weapon" employed in the Tinian operation for the first time was a "made to order" piece of equipment to facilitate the establishment of a wide beachhead on an island whose ragged, steep, and treacherous coral cliffs replaced the sandy beaches found in previous assaults in the Marshall and Gilbert Islands. Except for two small, narrow beaches on the northern end of Tinian, the shore line was marked by jagged coral cliffs up to fifteen feet high, forming a perfect barrier to the landing of heavy equipment, motorized armament, and tanks. Confronted with the problem of overcoming this natural obstacle, Navy Seabees on Saipan went to work.



LVT approaching the bluff.

The LVT (landing vehicle tracked) was chosen to supply the flotation and mobility necessary for putting ramps in place against the cliffs. For the superimposed ramp, the design called for two 10-inch I-beams, each twenty-five feet in length, spaced so that the ends of each could be hung immediately outside the bed of the LVT. Then a series of wooden beams were laid out in railroad-tie fashion along these I-beams. Holes drilled through the outer ends of the beams permitted the passage of steel cables through pipe spacers, the result being an articulated mat of great strength.

Inverted channel beam sections were welded to the under edge of the upper ends of the I-beams. These were designed to hook into the top of the rough coral cliffs against which the ramp would recline.

Thus, an LVT with long steel beams sticking out in front over its bow and a heavy platform of wooden beams draped over its entire length and bundles of steel matting over the stern was the strange-looking contraption designed to outwit the Jap defenders of Tinian's seemingly impregnable northern coastline.

The tactical surprise in the Tinian assault was so great and the beachhead was captured by the Marines and enlarged by them with the aid of the Seabees with such tremendous speed that the ramps were required for but a relatively short period. The fact remains, however, that those pressed into service proved highly successful.

LVT backing off after placing the ramp.

(Digested from an article by Francis Paul Organ in *The Military Engineer*)

FOREIGN MILITARY DIGESTS

"Bolero"

Digested at the Command and General Staff School from an article by Major General A. G. B. Buchanan in *The Royal Engineers Journal* (Great Britain) September 1945.

THIS is the story of "Bolero," and in particular of the part which the engineers, both British and American, played in it.

"Bolero" was a code word coined by the Combined Chiefs of Staff. It was to be used in planning the reception and the accommodation for the troop and supply "build-up" of American forces in the United Kingdom preparatory to the invasion of the Continent.

It was an unprecedented administrative and constructional achievement, and its successful completion was essential to pave the way for the build-up of the forces launched upon the Normandy beaches on D-day.

In order to form a just estimation of the magnitude of the task, it is necessary to recapture something of the "atmosphere" of the end of 1941 when the United States entered the war.

An American Special Observers Group (SOG) had been in this country since the summer, had oriented themselves and conducted many reconnaissances in plain clothes. The British Works Service was in the throes of a complete reorganization, including the introduction of a system of machine accounting. The organization also included a very large increase in staff, notably the District organization—this was fortunate as it gave a framework for the expansion. Civil labor was short and building tradesmen were mainly inexperienced youths, or elderly men who would normally have given up active work. Many materials were in short supply, more especially timber and steel.

From the start it was recognized that while the implementation of "Bolero" was a British responsibility, shortages both of manpower and materials made it essential for the U.S. forces to make a large contribution of assistance in both directions.

Broadly speaking, it was for the Americans to state their precise requirements, for the British War Office and Air Ministry to consider them, and then to agree with the Americans as to the parcelling out of the work and supply involved.

The policy of the British furnishing all facilities eliminated the problem of two agencies competing for the same labor and supplies, and the U.S. did not have to set up a duplicate contracting agency.

When the decision was taken to send an American Expeditionary Force to the United Kingdom the Quartermaster General was asked to prepare for receiving it and to estimate the cost of accommodating it in these islands. As has been mentioned, the Works Service was in the throes of reorganization and the Quartermaster General felt that in order to carry out this colossal task it might be essential to modify the reorganization. However, the Engineer in Chief advised against this and carried his point on the understanding that no delay would be caused.

The estimate which was asked for in a hurry (as many important estimates are,

unfortunately) was produced in half an hour and typed on a half sheet of paper. It amounted to £50,000,000. It was immediately reported to the Treasury who approved this amount also in half an hour.

Key Plans

The *1st Key Plan* was issued by the War Office on 31 May 1942. It provided for accommodating 1,049,000 U.S. troops.

This was followed on 25 July 1942 by a *2d Key Plan*, bringing the total number up to 1,147,000, of which it was planned that 904,600 would have arrived by 9 April 1943 with the balance at 120,000 per month.

These figures, however, were not destined to last for long, as it was decided to embark on the North African Campaign (Operation Torch). This caused the issue of a *3d Key Plan* on 11 November 1942.

The full "Bolero" program was reinstated on 12 July 1943 in the *4th Key Plan*:

Air Force	448,000
Ground Force	567,000
SOS	325,000
Total	1,340,000

This accommodation was to be completed by 30 April 1944.

The large increase of numbers is noticeable, and a still further increase a little later brought the figures up to 1,446,100.

As things turned out, the date of the operation for the liberation of the Continent was two months later than had been envisaged when the plan was made. This resulted in 300,000 additional American troops being in the country, and consequently much bivouac accommodation had to be used. As the winter season was over, this did not entail undue hardship on the troops.

In addition to providing accommodations for men, it was also necessary to provide depots for stores of all descriptions, and hospitals.

British Difficulties

British difficulties as regards labor and materials have already been mentioned and it has to be remembered that on their side they also had an accommodation problem of no small magnitude.

In order to receive U.S. troops in the Southern and Western Commands, much accommodation had to be surrendered and reprovided elsewhere. Many training units which had been established in these locations since the early days of the war had to be turned out and homes provided for them elsewhere. This work was called *"Bolero repercussion."*

Furthermore, before the operation could be mounted, the 30th Corps, consisting of the 50th, 51st, and 7th Armored Divisions, had to be brought back from the Mediterranean and established in this country, as did also the 1st Airborne Division and many other troops.

American Difficulties

From the American point of view, the policy that the British should provide all the accommodation required created many problems and difficulties which had to be solved and overcome. The principal of these were:

1. Scales of Accommodation. American approved scales were generally in excess of those adopted by the British. Consequently, a complete new set of standards for the U.S. forces in the United Kingdom had to be worked out and agreed to by War Office and European Theater of Operations, United States Army. It can readily be understood what a lot of conference work was necessary before complete agreement was achieved.

2. The British system of Works administration gave the Americans many a headache. As has been mentioned, the Works Service had only just been reorganized and both Q [Supply] and Works Staffs had not had time to appreciate their powers and limitations. Delays, therefore, were frequent and many services were referred to War Office which could have been dealt with at a lower level. While it was, of course, recognized that the British system was a matter solely for the War Office, the U.S. forces rightly felt that their work should not be hampered or

wasted by any slow working of the British administrative machine.

3. The location and acquisition of sites for new construction, especially that of depots, caused much delay owing to the claims of other Ministries, especially that of Agriculture. Available sites were often on low land and on unsuitable soil requiring much work to make them usable. Hospitals often had to be constructed in private parks, miles from a railway, and requiring complete water and sewage disposal systems.

4. British and American standards of construction varied considerably and this became at once apparent when U.S. troops arrived and began working on the program. The British were accustomed to work with brick, tile, plaster-board, and corrugated iron, whereas the U.S. forces worked with wood, and the use of British materials necessitated training schools for the Americans. Voltages in the United Kingdom differed from those in the States and the use of British and American equipment intermixed required additional transformers and circuits. Plumbing standards too were different and early arrivals from the States had to be supplied with British tools to which they were unaccustomed.

5. U.S. engineer troops were best suited for work on large projects such as depot construction in which large masses of earth moving and concrete construction were necessary. But by the time that they arrived in force, the bulk of this work had perforce been arranged for by British labor, both civil and military. The U.S. engineers had therefore to be dispersed over a number of minor jobs, such as expansions to camps for which neither they nor their organization were suited. It was not until the four large depots at Honeybourne, Boughton, Histon, and Lockerley were authorized that really suitable jobs on which a whole regiment could be employed were available.

6. British store nomenclature was entirely strange to the U.S. troops who had to become familiar with it by slow and sometimes painful experience. In the early days there was no little confusion because of the difference in names, and British noncommissioned officers had to be detailed to assist in American store depots.

Depots

A standard-sized General Depot was planned and first built at Wem (Shropshire). It consisted of 450,240 square feet of covered storage, 1,375,000 square feet of open storage, and a camp for 1,250 men. Road and rail served, eleven miles of rail and five miles of road. It was started on 14 December 1942 and completed on 30 June 1943.

On this model, i.e., 450,240 square feet of covered storage and 1,250-men camps, five other depots were constructed and were commonly known at the time as "Wems." The amount of open storage varied, of course, with the site and averaged 1,450,000 square feet, and rail and road lengths worked out at an average of 11.80 and 4.70 miles respectively.

All took roughly six months to construct, the work at Histon and Lockerly being entirely carried out by American troop labor, while Boughton and Honeybourne were planned and mainly executed by British. The average labor force on these depots was 1,500 to 2,000.

The largest depot was at Sudbury-Egginton, near Burton-on-Trent. It had well over one million square feet of covered storage and 9½ million square feet of open storage.

Hospitals

Nearly all new hospitals for the American Forces in the United Kingdom were built by contractors for the Ministry of Works acting as agents for the War Office. They were of two types, the station hospital of 834 beds and the general hospital of 1,084 beds.

The construction, though hutted, was essentially of a semi-permanent type and hardly that of a theater of war. The standard was definitely a high one and the staff, as compared with that of a British hospital, was on a lavish scale.

Hospitalization was also provided by converting certain of the militia camps, and

also by dual purpose and convertible camps, viz., camps adapted later for use as hospitals.

In all, nearly 94,000 beds were provided, and 30,000 extra beds were later added by means of tented expansions.

Camps

These were mainly built in standard sizes for 250, 500, 750, 1,000, 1,250, or 1,500 men. The majority were fully hutted, or hutted expansions, but a considerable amount of tentage, both winterized and summer, was also used.

Special Facilities

The undermentioned special facilities were required and provided.

6 Shops for the erection of railway locomotives and wagons.
3 Tire repair shops.
3 Tank repair shops.
5 Heavy vehicle repair shops.
11 Chemical impregnating plants.

Labor Figures

American engineer troops, Royal Engineers, pioneers, and civil labor were all employed on the program.

The average monthly labor force was about 40,000, and the maximum was 56,000 (January 1943). The maximum effective labor force produced by U.S. troops was 25,000.

Liaison

In order to ensure the successful running of the program it was, of course, necessary to establish a good system of liaison at an early stage. Accordingly a Royal Engineer officer was appointed as DFW's [Director of Fortifications and Works] liaison officer in the Construction and Quartering Division of the Office of the Chief Engineer, European Theater of Operations, United States Army, in August 1942, and correspondingly an American engineer officer represented his Chief in DFW's office. The work of these liaison officers was necessarily for the most part unobtrusive, but it was of the greatest value.

There were as well many other liaison officers of other branches of the Service.

Further liaison was achieved by holding Works Progress meetings at the War Office at frequent intervals under the chairmanship of the Deputy Director of Quartering. At these, representatives of Q Staff, Engineers, Transportation, and Finance were present, together with representatives from Commands and Base Sections. At these meetings all items causing difficulty were freely and informally discussed, delays were brought into the limelight, and the general progress was reviewed. Twenty meetings in all were held.

Air Force Program

Though this was controlled by the Air Ministry, and any details regarding the program must be regarded as outside the scope of this paper, it is nevertheless necessary to make some mention of it in order to complete the picture.

By D-day, ninety airfields were being operated by the U.S. AAF, of which fourteen had been constructed by U.S. engineers and the remainder turned over by the Air Ministry after adaptation.

A Heavy Bomber Station costs about £1,000,000. It requires over 400,000 square feet of covered accommodation, and the runways are equal to nearly twenty miles of concrete road twenty feet wide.

In addition to the actual airfield program there were a host of other requirements: advance landing grounds, ammunition depots (average capacity 20,000 tons), tactical air depots, marshalling areas, and repair depots.

The number of U.S. engineers employed on the Air Force Program in December 1943 totalled about 24,500. The strength of the U.S. AAF in Great Britain was well over 400,000.

Conclusions

In conclusion it must be strongly emphasized that the successful completion of the "Bolero" program was due to good teamwork on the part of both British and Americans. This was evident not only in the offices where the work was planned, but also in the

field where it was carried out. The writer well remembers a visit to Boughton Depot where he saw Royal Engineers, Pioneers, British civilians, and American colored labor all working together in perfect harmony. This is the spirit in which victory is achieved in war, and the spirit in which peace will be ensured in the years to come.

The Red Army — Foundations of Strength

Digested at the Command and General Staff School from an article by Lieutenant Colonel G. H. Nash, in *The Journal of the United Service Institution of India* July 1945.

LESS than fifteen years ago the Soviet Union was not strong enough to protect its interests. In 1931-32, weakened by the crisis of collectivization, it had to accept the loss of the Chinese Eastern Railway and the military problem of a new land frontier with Japan 1,500 miles long. In 1935, cutting its losses, it sold its rights in the CER for a paltry sum to Japan. Not until 1938 was there any outward sign of growing military strength; in that year and the next the Red Army fought a series of engagements in Outer Mongolia and Manchuria. Retreat was at an end.

The Red Army of today needs no introduction, but to what does this mighty war machine of perhaps some four hundred divisions owe its strength?

Down through the centuries the Russian soldier has proved himself to be a magnificent fighter. Ill-provided for and poorly equipped, still he has been more than a match for the armies of yesterday, and both Frederick the Great and Napoleon had good reason to respect him. Napoleon's armies met him not only in Russia but also as far afield as Italy and Switzerland, and time and again it was the stubbornness of the Russian soldier which made up for the frequent defects of provision and of command. What he can do when these defects are removed, we have seen in this war. We all agree that valor alone cannot win modern wars and that, amongst many other things, an army today requires machines and manpower.

On 1 October 1928, Russia went to war—*not* a war of bombs and guns certainly, yet a war which made high demands upon the people, which called for heavy sacrifice and devotion to duty and which was accompanied by considerable loss of life. Men and women suffered the privations of war—they subsisted on a bare minimum of food, they lived in overcrowded rooms and hovels, and often they were wretchedly clothed. This was a great planned offensive, boldly conceived, ruthlessly executed, and having as its object the achievement of industrial independence for a country which had hitherto been almost entirely dependent upon the outside world for machinery and armaments.

On 1 October 1928, the first five-year plan was inaugurated, and in five years steel furnaces, hydro-electric schemes, tractor plants, motor-car factories, and every other conceivable form of heavy industrial undertaking sprung up like mushrooms. The first five-year plan was followed by a second, and it was in 1938 that no less an authority than the late Corporal Schickelgruber claimed for Russia the strongest army, the strongest tank force, and the strongest air force in the world.

But God is on the side of the big battalions—where was today's and tomorrow's manpower to come from? One might say at once that Russian manpower is inexhaustible; in comparison with many other countries it is, yet fighting a major war on one front only meant denuding industry and the public services of every single man whose place could be taken by a woman. In addition, a large number of women served and fought as pilots in the Red Air Force, whilst others serving with the ground forces distinguished

themselves as snipers and ambulance personnel.

In August 1944, a generous scale of monthly allowances and lump-sum awards for both married and unmarried mothers was announced in the Soviet Press, and the title and orders of "The Heroic Mother" and "Maternal Glory" were instituted for mothers of large families, together with medals for the less prolific. No one is going to suffer for having a large family—in fact, the USSR may have the best part of the Planning Commissions' 300 million by 1975. What are they going to do with them?

"*Moral is to physical as three is to one.*" Nothing of moral value has ever been neglected by the Red Army. We have our welfare, a cheery newspaper with a glamor girl or two, the personality of our commanders, the visits of our generals to their forward troops, the knowledge of massive fire support in the attack, the explanation of the plan to our troops, special orders of the day, unit tradition, smartness, personal leadership, rum, and last but not always least, a hot meal and a large mug of tea. All well suited to the British temperament.

Moral planning in the Red Army is set at a much higher pitch—intense hatred of the enemy; dying heroically for the Fatherland; mass patriotic fervor such as we have not known since the Victorian age; the fame of heroes; published letters from mothers urging their sons to avenge the death of fallen brothers; colors carried into battle. In one word, *Glory*. And how is this attitude of mind cultivated and sustained?

One can produce dozens of informative pamphlets and army newspapers but their influence can only be felt if they are read (or read out), explained and discussed, and secondly, they can only have full effect if they are part of a coordinated propaganda offensive designed with a particular object.

For three years the aim of propaganda in the Red Army has been clear and consistent. It had one object: the raising of the fighting spirit of the Red Army to the highest possible level of collective and individual self-sacrifice and one might almost say "to a fanatical pitch."

And how is the coordinated propaganda offensive put across?

In each formation, unit, and subunit of the Red Army there is an officer or noncommissioned officer responsible for propaganda and welfare. In the regiment (three battalions) he is a senior lieutenant, in the battalion a lieutenant, and in the company probably a sergeant. But none of these men are working alone; directly or indirectly they are each directing the efforts of all Party Members—i.e., the Party Organization—in their unit or subunit, and in their work they are assisted by the company, battalion, etc., second-in-command.

Red Star describes the Regimental Propagandist as the "basic central figure of our propaganda amongst the men, the noncommissioned officers, and the officers," and adds that he must have a calling for his work. His activities are well worth recording, although within the limits of this article they can only be dealt with in barest outline.

If the unit is training, he goes around parades and seizes any suitable opportunity to chat with the men. Off parade he organizes the reading aloud of newspapers and ensures that the latest press communiqués reach the men. Choosing the best material from the Party men of his unit, he appoints "working" members in companies and platoons and directs their activities. He lectures to the men. Here are some lecture themes: "Let us add to the glory and tradition of our regiment," "Our cause is just," "The might of Soviet Arms."

In battle he is expected to be in the thick of the fight, and after battle, amongst a hundred and one other things, he writes letters of congratulation, in the name of his commanding officer, to each man who has distinguished himself. During the war in Europe the most energetic measures were taken to ensure that all ranks were kept constantly informed of the progress of oper-

ations; communiqués were taken down from broadcasts, cyclostyled, and issued down to platoons.

As every individual is far more interested in himself and his own unit than in someone fighting a battle a thousand miles away, the propagandist kept a notebook in which was recorded any stirring incident involving either an individual or a group of individuals in the unit, and later this formed the basis either of a lecture or of material for the regimental newspaper. But apart from newspapers, the regimental propagandist issued "lightning leaflets" giving immediate publicity to acts of courage and daring.

As long as the war in Europe lasted, even the fact that a unit was on the march was no excuse for relaxation in propaganda; the propagandist halted in a truck, jotted down the latest important broadcast news, and often not even waiting for routine halts, he stood by the side of the road and greeted the approaching columns with a "Congratulations! The Red Army has captured . . . " But the propaganda did not end with passing on wireless communiqués; halting in the ruins of a recaptured village, one of the liberated inhabitants—generally a woman—would be invited to tell the troops what frightfulness she suffered at the hands of the hated invader; a large amount of abandoned enemy equipment on the road would be seized as an indirect example of Soviet might, whilst a body bearing signs of torture or ill-treatment would be displayed before the men and they would be asked to avenge this inhumanity.

Finally Stalin, the State, and the Party are never omitted, and the approach to any form of propaganda is a Party approach—for example, a mutilated body may be used as an example to stress the wisdom of Marshal Stalin's order to "finish off the Fascist beast in its own den."

"The Press, to quote the words of Comrade Stalin, is the sharpest and strongest weapon of our party. During the war for the Fatherland this weapon played a great role in the heroic struggle with the German invaders and the achievement of our sacred aim—Victory." (*Red Star*).

The Red Army has over 150 newspapers. There are newspapers for particular fronts, newspapers for armies, and newspapers for divisions, and these do not include the more modest cyclostyled news-sheets in units. The language problem is no less serious than in the Indian Army, and some fifty-six of these Red Army newspapers are printed in languages other than Russian.

One might naturally conclude that Red Army personnel are the most well informed of any army in the world, and with regard to the great achievements of their Government this must be so; but there is another side to the picture, a side which bodes ill for the friendship foreshadowed in the Anglo-Russian alliance: except for occasional articles the Red Army is told little about the achievements of our own forces; in fact, most copies of *Red Star* convey the impression that the Red Army fought the war virtually unaided.

Somewhere near the beginning of this article it was claimed that nothing of moral value was ever neglected by the Red Army. The time has now come to note certain customs of the service which have definite moral value. Some of these customs are universal, others may become so through the publicity which they have received.

For hundreds of years Russian troops and their commanders have greeted each other on parade. Before the Revolution, if the troops had earned praise, the commander said "Bravo my children!" the response to which was "*Rad statatsa vashe 'stvo!*" (We are glad to try, your nobleness, or your excellency.) Today the response to praise is "We serve the Soviet People," and an inspecting general who, on approaching a unit greets the men, receives the response "We wish you health, Comrade General!"

Strange though they seem when translated, these responses undoubtedly create a sense of unity and strength such as we feel when on rare occasions we cheer our King, our Commander in Chief, or our Divisional Commander.

"We serve the Soviet People!" The Army is constantly identified with the People, and the recruit does not merely march to the armory, queue up, and draw his rifle or tommy gun. The issue of arms is made the occasion for a small ceremony. The recipient is reminded of the heroic efforts of parents, brothers, and sisters who toil unceasingly in the factories in order to arm him, equip him, and supply him with ammunition. During the European war it was a common custom to keep a running total of the number of enemy killed by a particular rifle or tommy gun, this figure being passed on to the new owner if a man was killed or wounded.

The Red Army—particularly since 1941—has been quick to realize the value of tradition, and so we find the history of various regiments diligently traced back a hundred years or more. And what could better symbolize the honor and traditions of a regiment than the regimental color? Obviously the regimental color is a moral factor, a means of raising morale, a source of inspiration, a call to Glory; and so in the Red Army the regimental color accompanies a unit when they go on service. Its position in battle is of particular interest, for it is chosen purely from the point of view of influence upon morale. At the beginning of a battle the color remains, cased or uncased, at unit battle headquarters, and only when the battle reaches its critical stage—perhaps when the result of the operation hangs in the balance—is it carried forward into the thick of the fight.

Occasionally, special honor is accorded to the wounded, and cases have been reported where commanding officers have marched their units "to attention" and paid compliments to the wounded lying around a dressing station. "We will avenge you!" is the keynote of these impromptu march-pasts and of the publicity which they receive in the Red Army Press.

No Army has been quicker than our own to realize the moral value of letters, but the Red Army, backed by the full force of a totalitarian administration, goes a step further—no soldier at the front may be without letters. If he has no one to write to him, well, some one must be found and someone is found! Usually as a result of an appeal made over the wireless.

Except for a short lapse during the revolutionary period, discipline in the Russian Army has since time immemorial been very strict, and no less a traditional hero of the Red Army than Field Marshal Suvorov (1730-1800) demanded the sternest discipline, insisting that "negligence must never be allowed to pass without punishment."

In a public conveyance, be it bus or tram, the soldier may not sit in the presence of an officer. The soldier may not carry anything in his right hand, which must always be free for saluting. And as for appearance—well, a soldier on leave is not allowed off his terminus station at Moscow until his turn-out is perfect, and if necessary he must wait there until his uniform has been pressed! These are the outward signs of a well-disciplined army, but there is another, sterner side: the loss of a weapon may mean a sentence of death for its owner, whilst conduct which might cast a slur upon the Army is dealt with with equal severity.

But if the Red Army have never forgotten Suvorov's views on discipline, they have also never forgotten something else which he handed down to them:

"The morale of the troops plays a preeminent part in war. The main weapon is man. Commanders shall devote great care to the soldier and his needs . . . subordination, exercise, discipline, cleanliness, health, neatness, alertness, daring, courage, victory, glory, glory, glory!"

The Battle of Metz

Translated and digested at the Command and General Staff School from a French article by General Brossé in *Délivrance*, published by the French Ministry of War, 1945.

During the month of September 1944, violent fighting had taken place on the Meurthe and the Moselle fronts from Luxembourg to Lunéville (see sketch, page 95). The American Third Army, which was exploiting to the limit its opportunities for disorganizing the routed German forces and for hurling the remnants of their formations back onto the territory of the Reich, had continued its pursuit operations with extreme vigor as far as the heart of Lorraine.

Substantial advances had been made south of Metz. By mid-September, Nancy had been liberated. But the Germans, recovering and receiving reinforcements, began to react vigorously. Château-Salins was taken and lost again toward the end of the same month, and the front in this sector became stabilized on the left bank of the Seille.

North of Metz, the enemy had been rapidly driven out of Luxembourg, but beyond this point the American units had run up against the Siegfried Line on the right bank of the Sarre. In this area, the units of the American Third Army had come to a stop west of Thionville and along the west side of the Moselle.

Metz—or at least the forts of its western zone—was the object of hard but vain attacks. The fortified Driant group, commonly called Fort Driant, located on a ridge dominating the Moselle west of Ars-sur-Moselle and about ten kilometers southwest of Metz, was assaulted twice. The complex ensemble of artillery bunkers, concrete emplacements, observation posts which were proof against gunfire, and underground shelters linked by an extensive network of subterranean passages and protected by antitank ditches, was first attacked on 26 September 1944, but without success. The attempt was repeated on 3 October after an aerial and artillery preparation, this time with the aid of tanks and other equipment. The American infantry with a remarkable display of energy occupied several portions of the fortress but succeeded neither in penetrating to the interior of the principal works nor in forcing a passage of the underground corridors. For six days, till the night of 9-10 October, they remained on the superstructure of the works and in a few shelters, prey to the fire of the artillery and mortars of the neighboring forts and subjected to spirited counterattacks by the Germans, and were obliged to give up their intentions to conquer this important strong-point.

The front became stabilized to the west of the city, and, on the whole, the deployment of the American Third Army traced an obtuse angle the sides of which extended on the left toward a point west of Thionville, and on the right toward a point south of Château-Salins with Metz occupying the apex.

The Terrain

Between the years 1900 and 1910, the defenses of Metz had been considerably augmented by the Germans. They surrounded it with a broad belt of groups of forts provided with modern means of protection. These works had been still further improved by the French after 1918.

The region to the east of the Moselle is divided into three sectors, forming acute angles with a common apex at Metz.

On the southeast, the very open valley of the Seille embraces the broad area between the high hills along the Moselle and the wooded heights of Delme and Château-Salins. The possession of the terraces which dominate this broad corridor east of Pont-à-Mousson and northeast of Nancy insured the Americans an excellent area of departure for an offensive for the conquest of the numerous inhabited places scattered over it. East of Metz, the sector of the French Nied and the German Nied is formed by a rolling plateau dotted with woods and villages. It lends itself to the action of all

ground and air weapons. On the northeast, the right bank of the Moselle as far as Thionville is level and open for a distance of some ten kilometers. It gradually rises beyond this point till it reaches a line of wooded hills which separate the basin of the Nied from that of the Moselle.

The German Defense

In September, the Germans had occupied Metz in considerable strength. The principal forts, especially, were manned by garrisons of excellent quality. But in November, when the battle began, the weak point of the German defenses in this sector, as in the others, lay in a scarcity of forces and, moreover, a scarcity of strategic reserves. The only way left to them for checking a double enveloping movement conducted by an adversary having numerical superiority, such as threatened the enemy troops at Metz, consisted in covering themselves from one branch of the pincers and going over to a counter-offensive against the other branch so as to break it up and hurl the broken portions back. The Germans, however, did not have at their disposal the forces they might have desired for engaging in a reaction of this magnitude. They had, therefore, to content themselves with local counterattacks which troubled and retarded the advance of the attackers at certain points but did not affect, to any noticeable degree, the methodical, almost mechanical development of the large movements ordered by the American Command.

The Plan of the American 3d Army

The mission of General Patton's army was not solely to obtain the surrender of the large city but also to cooperate to the full extent of its ability in the general plan of operations the purpose of which was to expel the enemy from the soil of France and hurl him back to the Rhine. It was therefore obliged to put into action all the resources at its command in a joint offensive. Hence, renouncing the project of an immediate assault against the fortress, it bypassed the latter on the north and the south, its two wings broadly extended, bringing them together again beyond the city. The area chosen for this rejoining of forces was that of Faulquemont-Boulay. The right wing was to attack along the axis Delme-Faulquemont; the left, in the direction of Thionville-Boulay.

The right wing was in a dominating position with remarkably fine observation. It was, therefore, prepared to undertake operations of considerable depth on a broad front beyond the Seille, which could not constitute an obstacle of any consequence. The left wing, on the other hand, had to cross the very difficult obstacle of the Moselle, both above and below Thionville. It was confronted, therefore, with the task of establishing small bridgeheads, then of expanding them, before it would be able to cross the equipment required for undertaking a long-range offensive across the river.

Thus, logically, the two operations had to be started one after the other, the right wing moving ahead first, over a wide front, while the left would begin by carrying out actions of a local nature which would be steadily expanded in order to gain a solid footing south of the Moselle. Afterward, the south wing would mark time while the north wing would boldly take the offensive with the greater part of its forces. In conformity with this general program, the maneuver comprised the following basic phases:

1. From 8 to 14 November, deep advance by the right wing toward the Remilly-Morhange front and, at the same time, seizure by the left wing of bridgeheads south of Thionville.

2. From 15 to 19 November, wide advance by the left wing toward the line Bouzonville-Metz, with the two prongs of the pincers coming together on the 19th at Vallières in the immediate vicinity of the city.

Advance of the Two Wings

The attack was launched in the morning of 8 November. On this day the Seille was crossed at three points and numerous inhabited places were captured, among them


10 5 0 10 Mi.
10 5 0 10 Km.
LUXEMBOURG
FRANCE
OBERPERL
PERL
GERMANY
FRANCE
Sarre (Saar) R.
Moselle R.
SIERCK
KOENIGSMACKER
KERLING
HAM
THIONVILLE
VALMESTROFF
MONNEREN
DISTROFF
BOUZONVILLE
SAARBRÜCKEN
Nied R.
BOULAY
WOIPPY
VALLIÈRES
MOULINS-LES-METZ
METZ
German Nied
ARS-SUR-MOSELLE
PELTRE
MARLY
POUILLY
MECLEUVES
French Nied
FAULQUEMONT
VERNY
REMILLY
HAN-SUR-NIED
Moselle R.
BARONVILLE
PONT-A-MOUSSON
NOMÉNY
TINCRY
MORHANGE
BENESTROFF
DELME
Sarre R.
MALLAUCOURT
JALLAUCOURT
Little Seille R.
CHÂTEAU-SALINS
VIC-SUR-SEILLE
MARSAL
DIEUZE
Seille R.
MOYENVIC
SARREBOURG
NANCY
Meurthe R.
LUNÉVILLE

Noménу east of Pont-à-Mousson, Mallaucourt and Jallaucourt west of Château-Salins, and Vic-sur-Seille and Moyenvic southeast of the same city.

On the 9th and the 10th, the attack extended from the Luxembourg frontier to a point east of Nancy.

The right wing made an extensive advance in the valley of the Seille and reached the foot of the Delme slope. Château-Salins was liberated.

The left wing crossed the Moselle at two points, at the Ham fort below Thionville and at Koenigsmacker.

On the 12th, the German position was completely crushed north of the Seille, and the right wing of the American 3d Army made an advance of fifteen kilometers from west of Remilly to a point south of Morhange.

The important heights of Delme and Tincry were quickly taken. The Nied was crossed at Remilly and at Han-sur-Nied. A large number of villages in the valley of the Nied and in that of the Little Seille northeast of Château-Salins were taken.

In the north, strong resistance was encountered in the efforts to expand the Koenigsmacker bridgehead and to capture Thionville.

On the 13th the infantry divisions mopped up the terrain taken by the tanks in the recently occupied region on the right side of the Seille.

In the Thionville sector, the troops again captured the points given up the day before, in the vicinity of Kerling. Thionville was to a large extent liberated.

Three of the Metz forts were taken, one of them being that of Verny, southeast of the city.

On the 14th, the right wing advanced south of Metz and over the entire front between the lower Seille and a point north of Morhange.

In the north, the Koenigsmacker and Thionville bridgeheads were joined. An advance of five kilometers carried the assailants to the line of Kerling-Valmestroff.

Beginning with the 15th, the right wing of the army, which had made deep advances and was fighting in the immediate vicinity of Metz, had pushed close to the southern limits of the city, but made moderate advances. The left wing, however, which had by this time won a spacious bridgehead south of Thionville, pushed vigorously ahead and extended its hold on the entire region west of the Nied.

On the 15th, the Koenigsmacker bridgehead was extended by the occupation of a zone south of Thionville.

On the south, the pocket which had existed in the American first lines near Morhange was eliminated by the capture of this city and also Baronville. In the outlying districts of Metz, General Patton's forces captured Peltre and Pouilly southeast of the city. The outskirts of Woippy and of Moulins-les-Metz were reached.

On the 16th, in the northern sector, the day was spent in preparation for an attack in force. On the extreme right of the southern wing, the front approached Dieuze and covered the entire area from Benestroff, an important railroad junction point on the Metz-Sarrebourg line, to the small but ancient town of Marsal on the Seille.

New advances were made in the area immediately south of Metz where Mecleuves was taken. Counterattacks, however, drove the forces which had captured it on the preceding day out of Fort Saint Hubert.

On the 17th the left wing made a bound of from six to ten kilometers ahead and seized possession of Sierck, Monneren, and Distroff. Marly in the immediate vicinity of Metz was captured. The German garrison was now closely crowded, on the south, in the very limits of the city, into which American patrols were penetrating.

On the 19th, the enemy resistance was completely crushed between Thionville and Metz over the entire area between the Moselle and the Nied. The advance made in this area was close to twenty kilometers. On the north, German soil was reached at Perl and Oberperl. Southeast of Thionville the line had reached a point close to Bouzonville on the Nied. In the south, American tanks were

driving in the direction of Metz and reached Vallières in the immediate vicinity of the city.

At the same time, south of the great city, the troops effected one last advance and also reached Vallières. The junction effected by the two wings at the very gates of Metz definitely constituted the encirclement of this city. The jaws of the vise had closed on the objective. On the 21st, resistance decreased in the city, though five of the forts were still holding out. Finally, at 1430 o'clock on the 22d, all resistance ceased. General Kittel, who had been in command of the 462d German Division, was made prisoner.

Thus, in the space of fifteen days the strongest city of France's eastern frontier had been forced to capitulate. Its fall marked nearly the complete liberation of Lorraine.

General Patton's double envelopment tactics had worked out with perfect precision. It does the greatest honor to the strategist who conceived it as well as to the troops who executed it in so masterful a manner.

Wisdom from the War in the Air

Digested at the Command and General Staff School from an article by Major Oliver Stewart in *The Navy* (Great Britain) July 1945.

Now is the time, while experience is still fresh, to summarize the chief lessons that have been learned from the war in the air during the struggle against Germany. These lessons fall into three groups: first, those concerned with the strategical air war; second, those concerned with Army support; and third, those concerned with the air war at sea.

The evidence of those who have visited Germany and who have inspected at close range damage done by the Royal Air Force and United States' heavy bombers is accumulating, and most of it supports the view that the damage was greater than had been supposed.

In nothing has there been a sharper conflict of opinion than in this matter of the damage done by strategical bombing. There were those at the beginning who held that it could win the war on its own; there were others who claimed that it did practically no military damage. The fact seems to be that the results come between these two views. The damage was very great and must have placed a severe handicap upon German industrial war output, while at the same time damaging her overall morale, but it is also clear that her well-disciplined nation held down by ruthless police forces could be made to continue war-making under the heaviest bombardment. Methods of protection are improved as are methods of attack. Factories are removed and placed underground, as were the great factories for producing the new Heinkel 162 Volksjaeger single-seat fighter and its Hirth jet unit. At the same time, protection for civilians and war workers was improved and the Germans were thorough in the kind of shelters they provided. These shelters seem to have been a great deal better than anything offered to civilians or workers in Great Britain and they undoubtedly contributed to the ability of the German people to keep fighting in the face of heavier bombardment than any to which we in these islands were subjected.

The strategical bombing conclusion must therefore be that it is a big factor in subjugating a country, but that it will not on its own bring victory. There must be the land battle and the occupying force which set the seal on victory.

More interesting because more complicated is close support for armies in the field. Here Britain was backward when war broke out. Her ideas were not in accord with the facts of modern weapon development. It was the Germans who showed how the aircraft could

be employed as a close-support weapon for the tank, and it was the Germans who showed in Crete how the aircraft could be employed as a transporter for the occupying troops. These two things were lessons for the Allies and fortunately the Allies learned them without undue delay.

Air Marshal Sir Arthur Coningham and Air Chief Marshal Sir Arthur Tedder put into practice these lessons. They employed large air forces in the direct support of the Army. They devised means for attacking enemy land concentrations and enemy communications. They worked out a whole doctrine of the use of air power in collaboration with land forces. It was this doctrine that was employed on D-day and that proved successful.

Finally there are the lessons of the air war at sea. Naturally the sinking of the two great German battleships the *Bismarck* and *Tirpitz* stand out in the mind. In both, aircraft played a part, but in one a much larger part than in the other.

The part of aircraft in the sinking of the *Bismarck* was mainly concerned with reconnaissance and preliminary attack. Aircraft shadowed the *Bismarck*, attacked her with torpedoes, and slowed her down. It was then possible for units of the Fleet to bring her to action and to sink her.

In the case of the *Tirpitz*, however, aircraft were the main means of attack. There was the daring assault of the midget submarines, but we are not yet certain what damage was done by these. Aircraft were forced to attack the *Tirpitz* many times before they sank her, and from this fact some have incautiously drawn the conclusion that aircraft are incapable of doing serious damage to a well-armored warship except under conditions of special advantage.

This conclusion, however, must be qualified. It was without question the coming of the 12,000-pound high-velocity armor-piercing bomb that altered the whole picture of aircraft versus battleship. With this bomb went the special sight used by the Lancaster crews.

The final attack on the *Tirpitz* which blew a hole 130 feet long in her side as we now know was made by a comparatively small force of Lancasters, each one carrying one 12,000-pound bomb. These bombs released from 15,000 feet will attain the speed of sound at sea level. They have then great powers of penetration and the armor that would be required to give static protection would have to be so thick and so heavy that it would be virtually impracticable to fit it.

The experience with the *Tirpitz* leads one to suppose that battleships can be sunk by aircraft equipped with the correct bombs and correct bomb sights, but that these aircraft must have a reasonably free run when they make their attack.

It therefore follows that the battleship may still survive as an important unit if it is provided always with its screen of shipborne aircraft. In other words, the big battleship now depends upon the aircraft carrier.

Very great advances have been made in the use of shipborne aircraft. The technique of taking off and of landing aircraft with high wing loadings has been greatly developed.

By means of rocket assistance a highly loaded fighter or bomber can be thrown into the air from a very short run. And arrester gears have been improved to such an extent that they can grab and hold an aircraft that would normally require a considerable space in which to dissipate its landing speed.

Carriers have both grown in size and diminished in size. The small carriers have been a remarkable success and much is owed to those who devised them and who laid the plans for their effective tactical employment. Bigger carriers are a more obvious development and as yet we cannot positively define where the limit will be.

The fundamental value of the carrier lies in the fact that it moves the operating base closer to the target. The consequence of this is that fuel load can be reduced and bomb or rocket load can be increased. It is hard

to see that the land-based machine can ever entirely overcome the advantage which the ship-based machine gets through working from a mobile airdrome. Secondly, although bold predictions were heard from the Pacific that the improvement in the range of big bombers is rendering all shipborne aircraft out of date, these predictions must be taken with the greatest reserve. There is as yet no positive sign that the shipborne aircraft is out of date or likely to become so. The whole of the war in the Pacific tended towards an intensified use of this type of machine.

Initiative and Unorthodox Tactics

Translated and digested at the Command and General Staff School from a Russian article by Major B. Korol in *Krasnaia Zvezda* (Red Star) 11 June 1945.

THE commander of a large unit in pursuit makes an appropriate regrouping of his forces every time they are about to attack a retreating enemy offering resistance in successive positions. The general information available relative to this line of resistance, its importance, previous battle situations, and the latest reconnaissance reports will determine the direction of the probable blows, and the size of the force and the means that may be needed for a quick breakthrough of the enemy's defenses.

If the enemy's position is attacked in the course of pursuit, the situation will be confused in most cases, and the personal initiative of the officers of the leading elements will be of decisive importance. The battle for a town described below is a good example of such initiative.

This town is located near a large lake (see sketch, page 101). A highway and a railroad run to it from the south through a narrow defile formed by the marshy shores of the lake and the wooded mountain spurs. Through this defile, a chain of low hills extends to the city. The Germans had already organized the defenses of the city's southern approaches by digging trenches and installing wire and other obstacles.

The remnants of the defeated German forces were in rapid retreat toward the town. Their rear guards consisted of armored infantry and small tank groups. Our infantry division, operating as a part of an army corps, was in pursuit. The tanks and self-propelled guns of another large unit were also advancing through this zone. The leading regiment engaged the enemy in the vicinity of a village, defeated him, and captured the village, but was forced to halt there because of heavy machine-gun and artillery fires.

At this time the situation was as follows. At a distance of two to three kilometers to the rear and left of the regiment, another infantry regiment of our division had become involved in bitter combat with the enemy. It was making no progress, however, since it had encountered particularly stubborn resistance from a considerable German force. To the village on the right, lying on the very shore of the lake, came a group of tanks and self-propelled guns of our division. They stopped temporarily because of lack of strong artillery support.

A German artillery group, consisting of forty-five guns, was firing from the chain of low hills mentioned above, and a heavy artillery fire was coming from the positions on the wooded mountain slopes. In addition, heavy guns were firing from the first line of trenches and stone houses. Thus the defile and all the roads were under heavy fire.

At this time the regiment occupying the village was in the following formation: The battalion on its western edge was busy repulsing counterattacks by German infantry

supported by artillery and mortar fires. The other battalion had dug in on the opposite edge of the village and was exchanging fire with enemy machine guns and tanks. The third battalion was in the second echelon, behind the left flank of the regiment.

The regiment was supported by two artillery regiments of the general headquarters reserve. In addition to this, it was reinforced by a battalion of division artillery and two antitank batteries. The regimental commander had assigned his own artillery to the battalions. In due time all the artillery was deployed in firing positions in the wooded area, one kilometer south of the inhabited place.

This considerable artillery support and its hurried concentration indicated that the division commander had anticipated strong resistance at the approaches to the town. The regimental commander, in accordance with the general preliminary plan of the division commander, intended to launch the attack with his left-flank battalion. The idea behind this decision was to break through along the highway which cut through the center of the defile, hurl the enemy back to the lake, and clear the way to the town for the main body of forces. During the course of the attack, however, a new decision developed in the mind of the regimental commander.

While the battle was in progress, the disposition of the enemy's forces was determined more or less accurately. It was on our left flank and in the center that he had deployed his main infantry forces. Reconnaissance had established that there was no German infantry on our extreme right flank. Apparently the enemy had not yet succeeded in occupying all his trenches and organizing his infantry fires throughout the entire position. But the narrow strip along the shore of the lake was raked from the low hills by the fire of antiaircraft guns which the Germans used against ground targets. From the outset, this prevented our tanks from moving along the shore.

The new decision called for striking with the right flank along the railroad line with its embankment and the long stretch of the woods along the shore, where the infantry had a better chance for success than on the left flank. If successful, our troops would emerge at the eastern edge of town.

Assuming that his tanks could not be committed in this sector, for the enemy's artillery, in spite of its heavy losses from our artillery fire, still could damage many of our tanks, the regimental commander decided to use the tanks in the second echelon. Proper arrangements were made with the tank commander.

A regrouping was quickly carried out according to the new plan. Leaving two squads behind, the battalion which was closest to the lake left its trenches and, concealed by the broken terrain, moved to the right. The battalion of the second echelon moved still farther to the right, nearly to the shore of the lake itself, with the view to repelling counterattacks upon reaching the town. Enemy strongpoints hindering the advance were to be neutralized by the tanks following behind the infantry. Furthermore, these tanks were to support the infantry in repulsing German tank counterattacks. A small number of German machines were cruising along the highway. It could be expected that the enemy would commit a large number of tanks as the outskirts of this city were approached.

It was decided to employ the supporting artillery from the same firing positions, without displacing forward. Concentrated fire was to be laid down on the enemy's lines of resistance, particularly on the artillery positions located on the range of low hills in the defile proper. Particular attention was to be given to the elimination of the observation posts located on these hills. With the observation posts gone, the German artillery on the wooded spurs could not continue to lay down effective fire on the shore area.

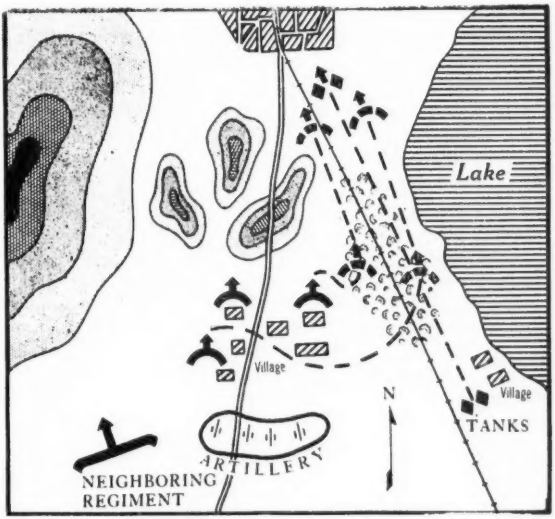
Fire support for the infantry and tanks which were assigned to make the attack on the right flank should be discussed in more detail. As was stated above, reconnaissance did not find any enemy infantry, nor

was there any artillery reported in this sector. The latter was located in the center and on the left flank. But it was firing from the low hills over the entire area, including the shore area. Consequently, in the event of the advance of the main forces of the regiment through the strip along the shore, the Germans would be able to take them under flanking fire. That is why it was decided to employ the bulk of the artillery for neutralizing the hostile batteries on the low hills. Since these batteries were echeloned in depth, five phase lines were designated for our artillery concentrations. Our infantry and tanks were to advance along the right flank with each transfer of fires from one phase line to another.

The result was quite a unique combination of fire and movement. The artillery fired on the enemy's batteries located in the center of the defile, while our infantry and tanks advanced to the right of the barrage along the shore. The operation resembled an artillery barrage but with one essential difference: the infantry followed its own exploding shells not so closely as usual and not directly behind but to the side of them. A part of our artillery was assigned the mission of firing a standing barrage along the railroad line to forestall any counterattacks from the left.

The new decision, quickly conceived and carried out in several hours, achieved remarkable results. Our concentrated artillery fire neutralized the enemy's batteries and observation posts on the low hills. The battalions wedged into the German defenses to a depth of four to five kilometers, after which the tanks went ahead, and, passing through the infantry battle formations, penetrated the southeastern edge of the town, with the two battalions following them.

This success produced a definite effect on the situation in this sector. Curiously enough, the Germans, apparently not knowing the strength of our forces which had broken through to the town, did not withdraw to it but to the mountain spurs and the woods. Under the blows of the unit on the left, the enemy began to withdraw from the entire defile. The division commander exploited the success by sending the third battalion into action.



In this example the commander of the regiment showed the judiciousness of his personal initiative, boldly taking a known risk. The enemy could have strongly counterattacked the flanks of the battalions. Furthermore, in the depth of their defenses near the lake the Germans could have had reserves unknown to the commander, since information concerning reserves is not always available during rapid pursuit operations. The circumstance suggested that the enemy had not yet succeeded in completely organizing this line of resistance. Consequently, decisive and quick action had to be taken to prevent the enemy from strengthening his position—and this was the basis of the new decision.

Triumph of the Principles of Sea Power

Digested at the Command and General Staff School from an article by Cyril Falls in *The Illustrated London News* 16 June 1945.

THE object of sea power is command of the sea, which is ability to use the sea routes for the purposes of war (including trade in war) and to prevent the enemy from doing so. It has generally been agreed that the best means of winning command of the sea is to seek out and destroy the naval forces of the enemy. One prominent writer on naval affairs, the late Sir Julian Corbett, attempted to qualify this principle. He argued that a naval battle was not necessary if the sea routes could be kept open without it. He has, however, found few supporters among students of naval strategy. If the enemy's naval forces will not risk decisive action, then it would obviously be madness to court disaster by attacking them in impregnable bases, and the naval war must therefore be conducted on the foundation of blockade and convoy; but this is a forced choice, not an ideal. The ideal is to be found in the American action, which resulted in the Japanese Fleet ceasing to be a major factor in the war in the Pacific.

In the struggle against Germany there has been no such opportunity, because the Germans decided not to attempt to overcome British supremacy in surface craft. That could have been effected only by a building program spread out over a number of years. It is hardly worth considering what would have been the British reaction to such a program, because the whole question is so problematical. What can, however, be said without fear of contradiction is that if the enemy had contrived to create a fleet capable of standing up to our own, and had won a decisive victory over it, the war would soon have ended. Our convoys would have been destroyed one by one, till hunger and lack of petrol had rendered us helpless.

As it was, Germany, by far the strongest land power in the earlier stages of the war, deliberately adopted the policy traditional to the weaker power at sea, which may broadly be described by the term commerce-raiding. In old days this was carried out by single surface craft, and Germany continued to practice this method. But she also adopted the more recent methods of commerce-raiding by vessels sailing below the surface—that is, U-boats—and what for our present purpose may be called vessels sailing above the surface—that is, aircraft. It was into the former that she put the greater resources, and it proved to be her most deadly weapon against Great Britain.

The result was that our own naval forces, apart from having to deal with single ships making comparatively rare excursions into the Atlantic, had throughout the war as their chief task that of attacking the U-boats and guarding the convoys from them. It was work at once hard and unspectacular, but it was of supreme importance. Great as had been the role of the Navy in earlier wars, there was never a time when the safety of the country depended upon it more absolutely. In the earlier stages of the war it seemed that the experience gained in the last war would enable us to keep losses down to reasonable proportions. Then the restless and inventive spirit of Dönitz devised the pack method of attack, thus compensating for the decreasing skill of the crews. By the time this new policy had been fully developed, the Germans were in a very strong position. They had speeded up the production of U-boats and they were in possession of bases on the coast of Norway and France, which had been denied to them in the last war. We were fighting under a new handicap, the loss of ports of the Irish Free State which had been of great service in that war. At the same time, the air assistance vitally necessary to the Navy in its great task was provided on an inadequate scale. Senior airmen and their Press and radio disciples who thought they could fight Germany "on their own," received a rude shock when it began to be a question whether the

flow of oil for their aircraft could be maintained. It was a decisive answer to the pretensions of any one arm to set itself up as independent of the others.

The menace was parried, though only just in time, by the diversion of a much larger proportion of the output of aircraft to the Navy and its needs, including Coastal Command; by the provision of escort carriers to sail with the convoys and bridge the deadly gap in the Central Atlantic which could not be covered by aircraft flying from bases on either side of the ocean; and finally, by a great increase in escort craft. All seemed well for a time, but with remarkable pertinacity the enemy returned to the fray in the final stage of the war with great numbers of submarines prefabricated in sections all over Germany. This offensive caused a good deal of anxiety, but though the U-boats were skulking round up to the very last, it is understood that the Allied losses in this phase were not serious. The Germans encountered a fully prepared machinery, backed by an adequate air force, well equipped, well trained, and remarkably well commanded, a very different defense from that with which they had had to deal when they instituted the pack system of attack over three years ago.

The course of events was thus not dissimilar to that of the last war. It also bore a resemblance to that of older wars before the invention of the submarine or the aircraft. The belligerent who has to rely upon a policy of commerce-raiding resigns himself to the loss of trade routes in open waters. He may hope to destroy several times as many ships as he loses himself, but unless he achieves an almost incredible success of his tactics he can scarcely hope to win command of the sea. We have undergone just the same sort of strain before. In four years from 1796 the French captured over 2,000 British ships, mostly with commerce-raiding privateers or corsairs. At one moment shipping in the Indian Ocean was virtually paralyzed by a handful of corsairs operating from Mauritius. In the same period we took just over 300 French vessels. The French thus made good use of their opportunities, while ours were extremely limited; but French commerce was driven from the seas, while British commerce was maintained, though with great difficulty and in face of terrible losses. So in this war the opportunities of British surface ships, submarines, and aircraft have been much more limited than those of the enemy, but we have contrived by hook or by crook to maintain the flow of supplies across the Atlantic, while German shipping outside the Baltic has been largely confined to furtive coasting voyages.

That, however, applies only to the revictualling of the British Isles, the main base against Germany, and to the denial of the Atlantic to the enemy. In other respects sea power has afforded us the same advantages as in the past. It has enabled us and our Allies to move our land and air forces to the stations to which it suited our strategy to send them. First of all, these stations were on the fringes of the enemy's power, in theaters where we could meet the enemy on terms of approximate equality while still unable to face him in the full flush of his strength upon the Continent of Europe. Sea power thus enabled the Allies to clear North Africa and to capture Sicily, so reopening the main route through the Mediterranean to Alexandria and Port Said. Then it enabled them to go a step further—to land in Italy, a relatively isolated portion of the Continent in which they could insure that the enemy did not bring overwhelming superiority of force against them. And, finally, sea power enabled them, when their strength had grown and their preparations were complete, to attack the enemy on his own ground, to invade western France in face of his great concentration of strength and his powerful fortifications, and in conjunction with the Russians to bring about his complete overthrow within the space of eleven months. There was no substitute for sea power in these operations, but naval vessels alone would have been as powerless without the air arm to establish the land

forces on shore as those land forces would have been to carry out their campaign.

In this war, sea power has shown that it can make of air power, which is one of its most deadly enemies, a strong and indispensable ally. Today the aircraft is an essential part of sea warfare, whether it is a single plane carried on a little ship, or a number carried on one of the great aircraft-carriers, or land-based squadrons covering the waters in which the naval force is sailing. It is sometimes said that the aircraft has brought about a decline in sea power. One might as well say, it seems to me, that gunpowder brought about a decline in land power, whereas, in fact, it only changed methods of fighting. The aircraft is just as much a weapon of sea warfare, a weapon of the Royal Navy, as the musket, when it was introduced, became a weapon of land warfare. There is no mystery about an aircraft, as was suggested when certain individuals, in the worst spirit of the trade guild or trade union, tried their utmost to prevent anybody from flying a Service plane unless he was a member of the RAF. More generous counsels now prevail, and the Army, as well as the Navy, has been allowed to fly aircraft for its own particular purposes. Yet, ludicrous as it now appears that they should ever have been questioned, these were rights which were, in fact, not easily won. They must therefore be carefully guarded.

Up to the present, sea power, arming itself with new weapons and adopting new methods, has maintained its importance. It has saved us from extinction and enabled us to overthrow Germany. It is just within the bounds of possibility that aircraft will one day become so big, so well armed, and capable of keeping the air for so long, that they will eventually do away with fighting and cargo surface ships. If that should happen there would be no point in quarreling about it. But there is no sign of it at present. So far from the surface ship becoming obsolete in all her functions, she has proved in this war to be completely up to date in a function in which most of us thought she might indeed have become obsolete, that of close support in land operations near the coast. On that point we have evidence from the enemy's side, as regards both the Salerno beaches and those of Normandy, where naval bombardment staved off very ugly situations for us and proved shattering to the Germans. In a word, this war has not altered our dependence upon sea power, but it has taught us that it must be ever more closely interwoven and coordinated with land and air power. The supreme lesson of the war is the strength of the link which binds together the arms of land, sea, and air.

Harmonicas and the Bombing of Germany

From *Britain* (British Information Services) September 1945.

German manufacturers of harmonicas unwittingly helped the RAF and USAAF to plan the bomber offensive over Europe. Harmonicas for sale in Britain were manufactured in Bavarian factories that had been converted to aircraft production. On each harmonica there was embossed an aerial picture of the plant where it had been made, so the British Ministry of Economic Warfare scoured British stores for harmonicas. Other aerial views of factories were found on the letterheads of pre-war business correspondence from German firms. Models of the factories were made, and thousands of commercial travelers and businessmen who had visited them were called in to describe as much as they could remember of the interior and layout of the plants.

Street Fighting in Large Cities

Translated and digested at the Command and General Staff School from a Russian article by Major General I. Managarov in *Krasnaia Zvezda* (Red Star) 11 May 1945.

THE fall of the garrison is inevitable if the attacking force succeeds in encircling the city and in throwing back the enemy's flanks, thus securing freedom of maneuver in his rear. The tactics to be employed in the encirclement depends upon the outline of the front protecting the approaches to the city, the layout of the city, the character of the enemy's defenses, etc. It is important that the fast-developing breakthrough should lead to the breaching of the enemy positions on the flanks, that is, in the sectors through which the attacking forces will envelop the city. It is on the flanks that it is almost impossible to avoid meeting engagements with the nearest enemy reserves, the mission of which is to prevent the attacker from penetrating the rear areas of the defenses protecting the approaches to the city.

A successful maneuver is determined by the swiftness with which the mobile units and the infantry strike. This is substantiated by one of the greatest offensive operations of the Red Army—the Danube Basin Operation. As is known, this operation ended in the destruction and routing of a large enemy force and in the seizure of Budapest, the capital of Hungary. The conclusive phase of the battle for Budapest will be used to illustrate the discussion that follows.

The first stage of the battle for the city proper usually takes place near its outskirts. Without enumerating all the measures undertaken by our command before the beginning of the attack on Budapest, we shall only point out that the artillery was quickly and secretly displaced to previously prepared firing positions. That is how tactical surprise was achieved. Reconnaisance elements had manned their observation posts six days prior to the beginning of the breakthrough. On the basis of aerial intelligence already available, these men studied the enemy's fire plan and his elaborate fortifications.

The planning of the artillery preparation was carried out according to the usually accepted method of breaching strongly fortified defensive zones. Horse-drawn 76-mm batteries were to support the infantry fighting in the city streets. Whenever necessary, commanders of these batteries, using their radios, could request the fire of heavier artillery. All necessary details for cooperation with the infantry and tanks had been worked out before the beginning of the battle.

The tactical employment of artillery as it was applied in the fighting for Budapest turned out to be, in our opinion, most effective. Essentially, it amounted to an extensive use of direct fires, in which all calibers, from 45-mm to 203-mm, participated. The light guns fired at embrasures and windows, while the big guns leveled buildings whenever it was necessary to make passages for the infantry. The mortars were used for laying box barrages around blocks under attack or separate large buildings.

Artillery weapons were attached to infantry regiments. Guns for direct firing were distributed to the battalions, with the mortars operating as battalion sub-groups. Officers were in charge of separate guns (particularly those of the heavy caliber), while the entire battalion artillery group was under an experienced artillery battalion commander. Mortar groups were either under the commanders of small mortar units or the artillery officers of the infantry regiments.

Such a decentralization of artillery command had fully justified itself in street fighting, for commanders of infantry regiments could easily call for artillery fires to suit the layout of the streets, location of the building, and the situation.

The artillery commanders of infantry divisions and corps retained only separate rocket-launcher units and battalions of heavy artillery. These battalions were emplaced in concealed positions and were assigned special

missions. They subjected to a methodical fire the squares and bridges which were most important for troop movement, and neutralized enemy batteries. Besides, they fired concentrations on separate city blocks before these were assaulted by the infantry.

Inasmuch as almost the entire artillery used direct fires, problems pertaining to the selection of observation posts were of particular importance. It stands to reason that observation in city streets, in the complicated labyrinth of buildings, is extremely limited. Therefore, the observation posts of the artillery and mortar groups were located in the tallest building in the vicinity of the firing positions. Personally observing the results of their fire, the commanders could reinforce any of the sectors with an additional number of guns or mortars in order to help the infantry advance. Stone walls and barricades were erected to protect the guns, crews, and ammunition from enemy fire. When there was no firing, the guns were kept out of sight, in the rear of the buildings.

Street fighting does not consist of squeezing out the enemy from one city block after another. Here, as in open terrain, a maneuver is necessary in spite of the fact that this is limited by the narrowness of the streets and by intense fires raging in these streets. Furthermore, equal distribution of forces and means does not allow of the accomplishment of the principal task, that of splitting the enemy. It was for this reason that maneuver determined all the activities of our troops in the streets of Budapest.

In order that we may examine in detail the organization of cooperative action in the course of street fighting, it is necessary to say a few words about the organization and the employment of our assault groups. As a general rule, each group had seven submachine gunners, five sappers, three or four light or heavy machine guns, and two antitank riflemen. Also, depending on the situation and the mission, up to two regimental and up to four division artillery guns were assigned to each group.

In assaulting a strong building located at a street crossing, the engineers reconnoiter it before the artillery goes into action. They locate mines and disarm them along the main approaches for the assault troops. The reconnaissance men help the artillerymen in building their firing positions. Then the artillery, using direct fires, opens up. The shells hit one corner of the building, then the other, thus making openings for the advancing assault troops.

Quite often, a building is given a "combination" shelling. Armor-piercing shells break holes in the walls first. Then into the openings are directed several tracer and fragmentation shells to explode in the building. At the same time, the sappers crawl up to the building under the cover of artillery fire. They have with them about ten or fifteen kilograms of explosives to widen the gaps if necessary. Shelling stops when the sappers signal that they have reached the building. The submachine gunners and the riflemen then go into action. As soon as the sappers' charge is exploded, the remaining enemy soldiers run out and are at once taken under the fire of submachine gunners and riflemen.

Then the infantry rushes to its objective. The men penetrate the objective as deeply as possible, occupy suitable firing positions, and firmly consolidate the achieved gains. And this is very important in street fighting. There was a case when an assault group knocked the enemy out of a building and began to advance. The surviving Germans, however, crawled on to the roof and entered an adjoining building. They returned to the original building as soon as our troops had moved farther on. The siege had to be repeated.

The following is a typical example of street fighting in Budapest. An assault group consisting of submachine gunners and sappers was given the mission of capturing a big building on a slope of a hill. There were, in front of the building, three rows of wire and a trench about fifty meters long. The Germans fired their machine guns through the windows and had mortar support coming from the opposite slope of the hill. Because of the terrain, our artillery could

not fire directly. Its fire, however, was successfully used for neutralizing the enemy mortars from concealed positions. Our mortars supported the artillery.

The assault group commander, availing himself of the wind which was blowing in the direction of the building, ordered his men to burn a lot of smoke-generating sticks. At first the Germans fired their machine guns through the screen. Later, apparently convinced that it was a diversional move, they stopped firing. In the meantime, the group assembled at the foot of the hill. Several men moved toward the flanks.

The sappers made two small passages in the first two rows of the wire fence. The men who were to assault the building crawled through. The third row of the fence was to be blown up, to serve as a signal for starting the assault.

The men stationed at the flanks took the building under an intense fire. Then the fence was blown up and the assault was under way. The attackers tossed grenades and incendiary bottles into the windows and then broke into the building. The enemy garrison defending the building was encircled and destroyed.

At the beginning, the Germans encircled in Budapest had a considerable number of tanks and self-propelled guns. These were used to reinforce their counterattacks, which in the first stages of the battle were launched quite frequently. To meet this tank threat, we placed antitank guns on street crossings in order to keep these crossings under continuous fire. Less important approaches were mined. All German tank assembly areas were immediately subjected to heavy mortar fire. Individual tank-hunters, armed with grenades, played a big part in fighting German tanks. They would climb onto a house and from there drop their grenades on the tank turrets below. This method was very effective.

In the employment of our own tanks, certain particular factors had to be considered. Massed tank formations could not be used in street fighting. There were barricades and other obstructions. Therefore the tanks followed behind the assault groups. Wherever it was particularly difficult to deploy the artillery, the tanks, firing from cover, were the first to support the infantry. Three or four sappers were attached to each tank for clearing paths in front of it.

It has been established that tanks units can be used only when a wide maneuver is to be executed for the purpose of breaking up the hostile force into small groups. To do this, the routes of advance have to be carefully selected and covered by the artillery and aircraft to facilitate rapid progress of the advancing machines.

In conclusion, it is worth while to mention the inventiveness and the intelligence of the Soviet soldier. The "sappers' artillery" is a good example of these qualities. When tightening the ring of encirclement around the enemy, our troops captured a great number of heavy artillery shells. An officer suggested a special contraption which, with the aid of an explosive charge, would enable our troops to hurl these shells into the enemy's lines. The explosion of the charge in the shell was accomplished by means of a specially constructed gadget made of a delayed-action electric detonator and Bickford cord.

These "sappers' batteries" were placed within 200 meters of the enemy's positions. It was possible to inflict considerable losses on the enemy. The range of these shells was about 600 meters.

A simple plan is always the best, and the battlefield is not the place for complications and untried theories.

—Major General O. M. Lund, Director, Royal Artillery.

Echelonment in Depth

Translated and digested at the Command and General Staff School from a Spanish article by Lieutenant Colonel Gregorio Lopez Muñiz, Professor, Spanish Army War College, in *Ejército* (Spain) July 1945.

No one ever has the slightest doubt relative to the absolute necessity for echelonment in depth in offensive action, which echelonment must be more accentuated the greater the magnitude of the contemplated maneuver and the greater the capacity for resistance the enemy is thought to possess.

In the initial offensive deployment, the various forces that are to participate in each of the successive phases of the battle will be suitably located so as to insure the continuity of the effort to effect a deep and rapid penetration.

There are two opposed theories regarding echelonment in depth for a breakthrough which aim at the achievement of the same end, though by different means, and which we shall briefly analyze as a basis for our conclusions.

The essential difference in the two theories consists in the fact that while one of them stipulates the breakthrough is to be effected by means of successively committed divisions, in the other the same result is sought by means of repeated efforts by each of the large units.

Theory of Repeated Efforts.—This theory is most clearly expressed in the French regulations published in 1940. The regulations reflect throughout concern for echelonment in depth in both large and small units. In the instructions for tactical employment of large units we read the following precepts:

"The attack formation of a large unit comprises, in the second echelon, reserve units the mission of which is relief or reinforcement of the first echelon. It also has the mission of taking care of any eventualities that may arise in the course of the battle.

"The division commander will frequently maintain an entire regiment in reserve."

The Infantry Regulations are no less explicit:

"A narrow and deep formation permits a succession of efforts and makes for duration. A disposition which is wide and of little depth does not permit the consideration of distant objectives nor any prolonged effort."

This echelonment in depth of the division gives rise to the deployment which we may call triangular and which is very common in our Army.

In it the division locates two regiments in the first echelon and one in the second; within each regiment, there are two battalions in the first or attack echelon, and one in the reserve echelon; and in each battalion there are two companies in the first echelon and one in the reserve echelon (see sketch).

Theory of Divisional Blows.—This theory is expressed in very definite form in the combat doctrine of the old Italian army. Experience has proved, declares this doctrine, that battles are won by means of divisional blows. Victory is the result of a series of tactical operations executed by a certain number of divisions which are always fresh at the moment when they are committed, and not through each of these large units striking repeated blows.

The requirements of this doctrine, which is based on the concept called "high tempo warfare," are fulfilled by the binary type of division, which has two infantry regiments, since a large unit is not available with the material strength necessary for delivering the crushing blows required to disorganize the enemy's resistance and at the same time permit rapid withdrawal from the battlefield to make way for a similar formation that will replace it to accomplish the mission.

We shall call attention to the four essential points on which the conduct of combat by such a division is based:

1. Action as a single unit with a limited

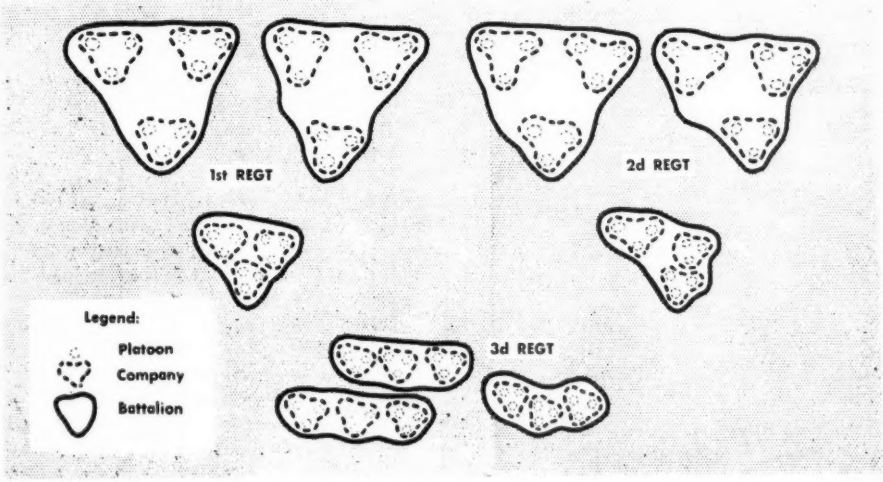
front of between 1,000 and 2,000 meters.

2. Suppression of maneuver in attack by combining decisive and secondary actions.

3. Capacity for penetration, limited in space and reduced in time to one day. It is a norm that a division should reach exhaustion in one day of fighting.

Theoretically, this clinches the operation. Before the fighting slackens due to depletion of forces, another unit comes into action and continues the blows with renewed violence.

Reality, the incontestible mistress of war, exposes this Italian concept as nothing more than a mere theory.



Triangular Disposition of a Division.

4. Minimum echelonment in depth within the division.

This large unit did not meet the expectations of its creators nor did it prove entirely suited for the missions of modern combat. The failure of the binary division was due to the fact that its means did not permit its fulfilling the role for which it was organized.

The division which becomes exhausted in one day of fighting must break through the enemy's positions within this period of time. If this is not accomplished because the strength of fortifications or the depth of the hostile position exceeds the division's ability to break through or its capacity for penetration, it is indispensable that the large unit engaged be promptly relieved by another unit of the same type.

The German Doctrine of War

Alongside the concept of maximum echelonment in depth in the division and the theory of divisional blows appears the German doctrine, which is more eclectic even though it has a marked tendency to reduce echelonment. In *Truppenführung* we read:

"The weakening of the forces that have to go into battle, in order to provide a body of reserves, often signifies the loss of all chances of success and exposure to the danger of being beaten piecemeal. There are times when it is preferable not to retain any reserves at all."

In the autumn of 1940, a Berlin War College professor stated: "Nothing is worse in battle than fixed plans. That defensive deployment of the division is all too uni-

versal in which, within this large unit and each of the subordinate units composing it, we find two constituent units in the first and one in the second echelon. The dangers attending the systematic application of this procedure are, indeed, serious."

If we assume active participation in shock and fire action at the very outset by the support platoons of each of the first-echelon companies (see sketch, page 109), then only twenty-four platoons, that is, less than a third of the strength of the division which consists of eighty-one of these small units, take part in the combat in the beginning.

The fire density, when the total width of the attack zone exceeds 2,000 meters, is low. Shock power is insignificant. Seventy-two platoons of rifle troops on a front of 2,000 meters, with the casualties they will suffer during their advance, will hardly amount to one man for every four meters at the decisive moment of the attack.

Practice confirms the fact that this deployment is attended by disturbing consequences in the conduct of offensive operations.

The lack of power in the front-line echelon renders it necessary to add to it the support platoons almost as soon as action begins, and, with no less promptness, the commitment of the reserve companies of the battalions is required.

Instead of launching a sudden and violent action hurling all means into the battle at the very outset, the division enters piecemeal into the operation, engaging in a series of successive actions each of which lacks the force required for a successful termination of the undertaking. These halts, born of the weakness inherent in this sort of deployment, assist the enemy in concentrating his fire and permit him to knock out the aggressor a bit at a time.

While the battle is in progress, passage of the line of exhausted units by troops initially held in reserve is extremely difficult, slow, and likely to result in heavy losses, unless aided by unusually favorable terrain conditions. If it is necessary to wait till dark for effecting these reliefs, the pauses occurring in the course of the attack favor reorganization of defenses.

Troops echeloned in depth, in formations concentrated on the battlefield to any marked degree, constitute a magnificent target for artillery and aviation.

Essentially, therefore, the echelonment in depth of the division will be reduced to the point where, if necessary, the reserves for some of the echelons may be suppressed, at times, with consequent reduction of the strength of the forces in all.

The Russian Doctrine of War

Attack is organized on the basis of echelonment in great depth effected by previous dispositions of the large units which are to participate in the battle in successive waves and whose number is practically the same both in the case of those beginning and those subsequently continuing the action.

At the same time, and for the same reasons that dictate the same procedure by the German Army, the echelonment in depth is considerably reduced in the division and the lower infantry units composing it. The small units are deployed one alongside the other, with intervals between them occupied by other formations which at the start are in a second echelon.

The strength of the reserve units is regulated in accordance with circumstances, but normally may be fixed as follows: one platoon, reinforced by antitank weapons and heavy machine guns in the battalion; one company with the same type of weapons in the regiment; one battalion with infantry guns and antitank weapons in the division.

To prevent unnecessary casualties as a result of excessive concentration of forces, the division attacks with a frontage of approximately four kilometers and never less than 3,000 meters.

In the offensive deployment of any unit whatsoever, there frequently exist, over and above the tactical factors inherent in the situation, other purely psychological

factors which lead, whether we are aware of it or not, to the greatest possible echelonment in depth. The dangerous situations the imagination is able to conjure up, lack of confidence in what the others will be able to do, or the desire to act independently may be translated into that keenly felt necessity for maintaining an abundance of reserves in order to have means for taking care of contingencies. The captain of each company jealously guards his support platoon. The battalion commander holds back not one but two companies if possible. The colonel of the regiment will not be satisfied with less than a battalion, and the division general reserves for himself an entire regiment.

Anxiety in battle for what may happen leads very frequently to the abandonment of all effort to accomplish what one ought to. We should not close our eyes to predictable contingencies, but neither should one permit his mind to become obsessed by the unpredictable things of the field of battle.

The end to be gained is none other than the crushing of the enemy's will to resist, which, depending on the situation, requires an effort of greater or lesser depth, of more or less persistency, of more or less potency. The initial deployment of forces has to be adjusted exactly to this end.

It is impossible to dictate rules of a general character relative to how many units are to be deployed in the first and how many in the second echelon. Tactics is absolutely opposed to the making of a *priori* decisions. After careful investigation, when one believes himself to be in possession of a sufficiency of formulas and one asks himself how they are to be applied in a real case, one always obtains the disconcerting answer: "In accordance with the situation." This is exactly the disheartening conclusion of such studies.

Though we may have to flee from every semblance of fixed forms, there must always be present in our minds certain procedures which will be of great help in the solution of all tactical problems, whatever their nature.

The problem is, first of all, to provide that echelon which directly conducts the attack, sufficient forces and means for its action from the beginning on, and all the intensity and violence necessary for breaking the enemy's will to resist.

The problem is to prevent premature exhaustion of this attack echelon and the successive commitment of other units with which one is hardly able to compensate for casualties, to say nothing of achieving any reinforcement or increase of strength.

The question is to avoid those problems of continuity which are necessarily introduced into the rhythm of the advance when a force is tied down to the ground because its combat capacity is inferior to the resistance it has to overcome and it is necessary for another and fresher unit to pass its lines.

The problem is to diminish as much as possible the movement of units in formations of marked density from their positions in the rear to the line of fire.

The objective is always clearly defined inasmuch as it is definitely stated in the mission. The problem is to adjust the means to these ends. To be able to do this, one must look directly ahead and decide, through analysis, what strength of forces must be committed as well as the most advantageous form in which to combine them, being ready, if circumstances demand it, to play all on one card. Indecision and timidity are completely opposed to the nature of war, which requires violent and decisive action, definitely oriented in a certain direction and tenaciously prosecuted.

Whatever forces are deemed necessary are to be employed for the attainment of this objective (the basic purpose of the operation, which must be continually kept in mind). Whatever forces remain over will constitute the reserves. To proceed contrarily to this, that is to say, to begin to theorize relative to more or less probable contingencies, to turn an anxious gaze toward one's flanks, to permit one's mind to be filled with worries which do not belong

to one anyway but to the higher command, leads with almost absolute certainty to a condition where it will be very hard to accomplish the mission, to say nothing of the fact that the situations created by numerous imponderables on the field of battle cannot be accurately solved.

If the commander, whatever his category, considers that he should commit all the forces at his disposal, he will not hesitate to do so, informing his immediate superior in order that the latter may know that he is out of reserves and may adopt whatever measures he considers proper.

Likewise, if a commander wants his subordinate units to deploy all their forces, he must assume the responsibility for this decision and give concrete orders.

Whatever the echelonment in depth within the division and its regiments, it will not hinder in any way the action of the heavy weapons of the infantry in the active preparation of the attack and in the attack itself. Maintaining, if this appears advisable, a regiment in the reserve of the division and a battalion in each of the other two regiments does not absolutely mean that the heavy weapons of these units have to be held in reserve. One would, by so doing, deliberately fail to take advantage of a mass of fire of great volume and power the effect of which might be decisive. If it is not planned to use them in their own specific manner, the machine-gun companies, 81-mm mortars, infantry guns, even anti-tank guns of all the reserve units should play an active part in the operation.

It must not be forgotten that the mission of the reserve is to insure a full development of the operation. The commander must not commit it prematurely; neither must he delay its commitment if it is considered that the crucial moment of the battle has arrived.

The Air Battle of Berlin

An article by Flight Lieutenant R. F. Delderfield in *Britain* (British Information Services) June 1945.

THE Air Battle of Berlin has been a long story of the crippling of key factories, disruption of railways and roads, and destruction of bridges in this great hub of the German war machine. It is a battle which has claimed heavy casualties—seventy-three aircraft were lost by the RAF in the one night of 25 March 1944 when 2,500 tons of bombs were dropped.

When Berlin was discussed as an RAF target by members of the general public it was often assumed, quite erroneously, that the bombers were merely striking at the enemy's morale.

Berlin's share in feeding the enemy's war industries has never received the publicity given to the factories and heavy industries of the Ruhr and Silesia. Yet the object of the RAF's seventy attacks on the city between 26 August 1940 and the end of 1944 was in every way as strategic as the bombing of the Krupps plant at Essen. Hundreds of priority war factories clustered around the capital. One third of the Nazi locomotive production took place in Berlin. Fourteen main railway lines sprouted from Berlin's railway centers. In addition, Berlin offered a number of other targets which fitted into the scheme of Allied air assault. Chief among these were the Government buildings of the Tiergarten. Stalin described Berlin as the enemy's lair. It was certainly the true brain of the immense machine which scythed its way to the Volga in the east and to the English Channel in the west.

Late in August 1940, soon after the Luftwaffe's initial attack on Croydon, London's airport, the RAF set out to crack that skull. Hitherto only leaflets had fluttered down over the capital. Between August and December, in the second year of the war, the RAF paid Berlin thirty-three visits, all aimed at

crippling the key factories that engaged such a large number of the workers living in the German capital.

The Battle of Berlin had opened. It was to pass through a series of stages, leading up to the terrifying daylight assaults of the United States Army Air Force, delivered when, in the east, Zhukov's forces were within fifty miles of the biggest prize of the war, and in the west, Eisenhower stood on the Rhine. But by that time the face of Berlin had undergone many changes.

After the first series, in 1940, attacks gradually mounted in weight throughout 1941 and 1942, but it was not until January 1943 that the city began to crumble under far heavier blows. In two successive nights, the RAF dropped just short of 700 tons. A few days later, on 30 January, Berlin had its first daylight attack.

At 11:00 AM Goering was due to broadcast. The occasion had been given the widest publicity in Germany. But about a minute past eleven o'clock the program spluttered to an indecisive conclusion and was not resumed until nearly an hour later. RAF Mosquitoes had bombed the city and the Reichsmarshal had gone to earth. During the afternoon more Mosquitoes visited Berlin.

It was the first time the Mosquito, fastest bomber in the world and one which can fly in conditions that ground heavier aircraft, had made headlines. In the months to come, Mosquito pilots became Berlin specialists. Again and again they flew to Berlin by night, eventually dropping up to 4,000 pounds of explosive per aircraft and often flying in a force of sixty aircraft at a time.

On 1 March 1943, not much more than a month after the interrupting of Goering's radio speech, RAF Bomber Command again attacked Berlin by night, dropping nearly 600 tons. The greatest weight of bombs dropped by the Luftwaffe on London was 450 tons. This attack on Berlin speeded evacuation. Between March and the next group of three major attacks, carried out in August and September 1943, it is estimated that about one and a quarter millions of Berliners left their homes for safer areas in the east. It was not foreseen by the German authorities that within eighteen months those same millions would be trudging back to the capital from Polish and Silesian areas overrun by the Red Army. When that happened they found their native city in a badly battered condition.

By mid-November the attacks had begun again, and this series, which lasted until well into the New Year, soon made Berlin the most-bombed city in the Reich. The series opened on the night of 18 November, when 350 two-ton bombs fell on the city. Every aircraft of one bomber group carried a "blockbuster." Four days later Berlin received its heaviest attack up to that time. Two thousand three hundred tons of high explosive and incendiary bombs went down, a great force of Lancasters, Stirlings, and Halifaxes concentrating on the capital. Night-fighter squadrons and massed batteries of antiaircraft guns failed to ward off the attack.

By mid-February 1944, when, pending D-day, the weight of RAF Bomber Command's attack was about to be turned on transport and ammunition targets in France and Belgium, it was possible to assess the damage caused by these attacks.

Reconnaissance pictures showed that sixty percent of the Government buildings in the Tiergarten area were destroyed, and 326 factories had either been destroyed or badly damaged. Of this total, 103 were on the priority list supplied by the Ministry of Economic Warfare. The huge Siemens works, a "one-plus" priority war factory engaged in the manufacture of vast quantities of electrical equipment, had received damage comparable with that done to Krupps of Essen, but this had occurred during the raids of the previous summer. In the first six attacks of the winter series nearly 10,000 tons had fallen on key factories within the Berlin area.

The need for heavy bombers in the operations on the Western Front gave Berliners an opportunity to take stock of their ruins, but in the following summer there was no lull in the air war over the capital. While

heavies were engaged elsewhere, RAF Mosquitoes flew to Berlin as frequently as nine times a month—a figure to be surpassed in 1945. In the period April-December 1944, they dropped 2,800 tons on the city. Between June and November, U. S. heavies were carrying out daylight raids, and it has been estimated that, one way and another, Berliners spent nearly 185 million hours in air-raid shelters during these six months.

The final stage in the Air Battle of Berlin began with the Russian advance into Brandenburg. In one daylight attack the U. S. AAF put down 2,500 tons, and reports from neutral sources described conditions of chaos existing in a city already battered by the long series of assaults which preceded the final phase. Sufficient evidence was available to declare Berlin no longer the brain of the German war machine, much less a productive source of its war material. Its housing—or lack of housing—was one of the biggest single problems facing the enemy's civil administration, and its difficulties had been vastly intensified by the constant influx of hundreds of thousands of refugees from the east.

This state of affairs had been brought about by the whole series of attacks extending over a number of years. The Berlin assault cost Britain's Royal Air Force over 800 aircraft. It was always an operation attended by difficulty, danger, and loss. In earlier days, the crews of Bomber Command had to face a long journey over sea and enemy occupied territory, heavily defended by fighters and flak. Latterly there was less risk. But throughout the war the Nazi capital occupied a prominent place on the Allied target list. Perhaps this is fitting, for, besides being a military target of immense importance, Berlin was the city which incubated the savage attacks upon Coventry, London, Rotterdam, and Belgrade.

Today it is a monument to the deadly effectiveness of the bomber.

The Victory of Soviet Aircraft Designers

An article by Colonel Nikolai Denisov in *Information Bulletin*, Washington Embassy of the U.S.S.R., 21 August 1945.

WHEN Soviet aviation plants in the early months of the Soviet-German war had to be transferred to the interior regions, where they had to be rebuilt, the work of the aircraft designers was seriously complicated. The Germans at the time commanded the latest aviation techniques previously tested in battles in the West. Soviet inventors nonetheless launched a determined struggle against their German counterparts from the first days of hostilities.

The first to score a victory over the German aviation engineers was the Soviet designer S. Ilyushin. No more than a hundred days of war had passed when a new Soviet plane appeared on the battle fronts. Well armed and armored, this plane flew low over German tanks, infantry, and artillery. Bullets and shrapnel could leave only insignificant marks upon its hull. Its fire was nothing less than murderous. Panzers were set blazing. German guns tumbled from their carriages. Nazi soldiers and officers perished by the hundreds. Named the "Black Death" by Hitler's soldiers, this assault plane appeared over the battlefields in growing numbers and came to form the backbone of Soviet attack planes, unsurpassed in war.

German designers attempted a reply with attack planes of their own by revamping their older models. General Richthofen, for example, was furnished with a revamped Henschel 129 during the Battle of Stalingrad. Then followed the Junkers 87 bomber. Three-fourths of the German machines participating in these experimental actions were destroyed. Not even the Focke-Wulf 190 fighter, having lost its best fighting qualities when applied as

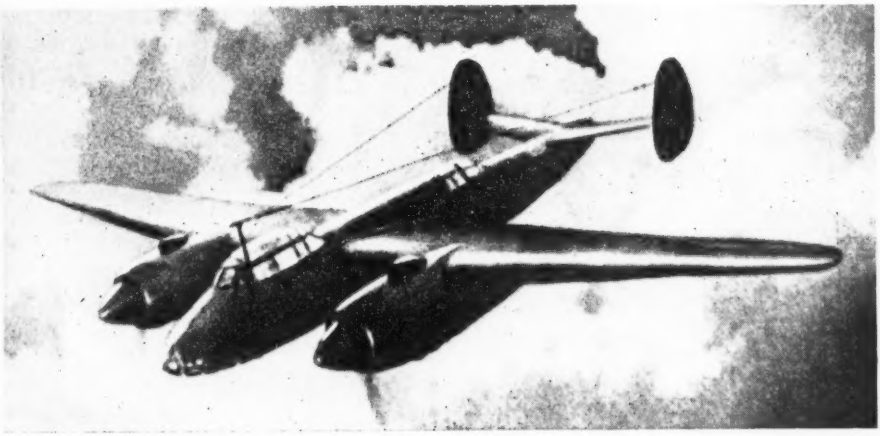
an attack plane, could solve the problem.

The Soviet Ilyushin-2, on the other hand, was steadily improved, and became one of the most effective aircraft of the Red Army.

When the Germans launched their predatory war against the USSR, they loaded their fighter squadrons with Messerschmitts. Soviet engineers, therefore, had to design a superior machine for speed, maneuverability, and firing potential. The difficulties were enhanced by the fact that the Messerschmitt fliers began to wage battle on the climb and dive. This called for great durability of aircraft and extremely powerful motors. In the summer of 1942 Soviet engineer Alexander Yakovlev designed his Yakovlev-1, which filled the requirements admirably. Flying these machines, the airmen of a Soviet Guards aviation regiment gave a splendid account of themselves against top-notch German fliers of the so-called peak ace squadrons. This Soviet regiment in a short time downed about 100 Messerschmitts, losing only two fliers and three planes.

Another Soviet fighter to appear at the same period was designed by engineer S. Lavochkin. This craft could not be excelled by the Germans on the climb or on the dive, and soon took a leading place among Soviet fighters combating German bombers.

Neither A. Yakovlev nor S. Lavochkin rested on his laurels. Both designers continued to improve their respective machines. Best known of their models by the end of the war were the YAK-9, YAK-11, and YAK-7. Improving upon the speed and maneuverability of these planes, introducing certain changes in their equipment and augmenting their armaments, the designers rendered them superior to the German fighters.



Tupolev-2, a Soviet fighter-bomber. (Sovfoto)

An important factor was the methods of the Soviet designers. Soviet aviation engineers are not laboratory recluses. It would be difficult to determine the limits of their activities. The designing bureaus, factory departments, and flying fields are only some of the places where they may be found on the job. During the war they spent much of their time observing their machines in action and constantly kept in touch with the Red Army Command and with Generalissimo Stalin, whose apt suggestions often put them on the right track in their search for perfection. Thus they were able to improve their planes quickly and effectively and to

render them fit for all combat conditions.

Having created a formidable assault plane and fighter, excelling those of the enemy, Soviet designers achieved equal successes in bomber craft. The late Petlyakov had worked out two basic models of a light and heavy bomber. The four-motored Petlyakov-8 is well known to British and American fliers and aviation engineers. In 1942 this plane carried Molotov over Germany and England to the United States. The Petlyakov-2 is an excellent dive bomber, far superior to the German one. Numerous PE-2 squadrons during the war solved the entire gamut of problems from operations on the field of battle to bombing raids against targets in the enemy's hinterland.

S. Ilyushin, Soviet attack-plane king, designed the IL-4, an excellent day and night bomber. The qualities of this plane, its enormous carrying capacity and range of flight were most thoroughly exploited by the Soviet flyers in their complex operations.

These are by no means the only Soviet bombers which participated in the battles of the Soviet-German war. One of the most successful models was the TU-2 designed by A. Tupolev. A multiple-task plane, it can fly over long distances without fighter escort and can serve for operations in the field as well as for distant raids against the enemy's hinterland. An excellent light bomber is the PO-2 designed by N. Polikarpov. It is equal to the TU-2 in ability to cope with strenuous tasks, and because of the ease with which it may be controlled, its low cost of construction, and the faculty of striking even the smallest targets, the PO-2 is admirable for action in the field.

Provided with these formidable planes by the country's aircraft engineers, the Soviet fliers were able to carry out their combined operations effectively. This was the victory of the aircraft designers.

Revision of Coast Defense Doctrine

Translated and digested at the Command and General Staff School from a Portuguese article by Vice Admiral Botelho de Sousa, in *Revista Militar* (Portugal) July 1945.

Two characteristics distinguish the second World War from previous wars: (1) the accentuated importance of the logistical factor, a result of the total nature of the conflict and of the frightful expenditures of matériel; and (2) the amphibious, or rather triphibious, nature of the great majority of the campaigns, with even those that are definitely continental in character depending indirectly on the seas for the transportation of the enormous quantities of supplies required by them.

Formerly the term "amphibious" was applied to the operations carried out either on or against the enemy's coast and requiring the cooperation of both land and naval forces, with the one or the other preponderating during different phases of the campaign or operation.

The mission of coast defense was to oppose enemy action by naval units or ground forces which attempted demolitions in the coastal areas, local landing operations, or invasions by way of the coastal frontiers. This defensive action and its preparation are, naturally, influenced by the changes occurring in the means and methods of warfare resulting from the great conflict. On the other hand, coast defense and its operations are influenced by the forms assured by the offensive.

Coast defense has always lagged behind, for the country involved, because of the great resources required, prefers to expend these resources on active or offensive means. Hence, in every war coast defense has occupied a place in the background, and its organization has been in part, at least, an antiquated one.

Of all technical advances, the one which

has been at the root of the most truly revolutionary changes in coastal warfare, as well as in the conduct of war in general, has been aviation. Its extraordinarily rapid development, which has raised it to the rank of an armed force as important as either the ground or naval forces, has been the principal factor compelling complete revision of our concept of coast defense. It is the air force, above all else, that has been responsible for the changes that have occurred in these basic concepts, both from the organizational and operational standpoints. Its influence has to be considered both in the solution of the strategic problems of coast defense in general and in the tactics of the various operations that might be undertaken against the coast and its defenses.

The success of the attacker in operations against a coast was formerly based largely on surprise, which was not as yet favored by the speeds attainable by boats, though these speeds were, indeed, constantly increasing. In the beginning, aviation employed more for reconnaissance than for tactical purposes, favored the defense, for it created a sufficiently broad zone of security off the coast. The surprise element depends on the extent of the coast to be defended. If aviation favors the defense by guarding against surprise attacks, it favors the attacker to a much greater extent, especially in the case of naval attacks, because it has here been transformed from an element for maintaining a watch over the enemy to a tactical factor in attack, which surpasses the naval factor in value.

The radius of action of aviation has grown enormously. Not only may the attack be carried directly to the enemy by the heaviest of bombers from bases situated at distances of 1,000 miles or more—which distances are daily being increased—but at the present time the use of carriers permits carrying the attack (though with lighter planes) to any place on the surface of the earth, especially when the attacker possesses the naval supremacy, which will permit him with reasonable security to move these mobile bases over the surface of the seas. It will not be long—if indeed the time has not already arrived—when practically any distance, even such strategic fields of maximum extension as are represented by the Pacific, will be within the range of heavy bombers.

Airplanes are able to make use of three different weapons against the coastal organization—artillery, bombs, and mines. Their ability to fly directly over their targets increases their efficiency enormously in comparison with naval units. Their artillery—always of small caliber—cannot compare, from the standpoint of its effectiveness, with that of naval units except where employed against the mobile portion of the coast defense (troops and artillery) and against airfields. The situation is altered considerably in favor of aviation with the employment of rockets against the less robust of fortified works and even against the boats of the mobile naval defense.

A prime factor in coastal warfare, aviation, in consequence of its extreme mobility, has occasioned a great change in defense organization as well as in methods of attack. As long as coastal defenses possessed a fixed character—with the exception of the troops permanently or temporarily assigned to it—this same passive and immobile character constituted the reason, as we have said, why the financial resources which the state provided for the constitution and maintenance of armed forces were employed preferably for mobile forces, both on land and sea, able to engage in both offensive and defensive operations.

With the advent of mobile artillery of steadily increasing calibers, the employment of mobile batteries in coastal defense and the employment of batteries not permanently assigned to this defense became a possibility. Coast defense, having thus become partly mobile, has become to a greater and greater extent part of the general territorial defense. The extensive employment of aviation in coast defense has permitted the attainment of what appears to be the last word in mobility for this defense, and has caused it to become merged more

and more with general defense, since this mobility, and the possibility of the employment of aviation over water as well as over land areas, insures the maintenance of a watch over the enemy far beyond the limits of the coast line, thus guarding against surprise attacks by naval forces. Aviation is the only means available for guarding against surprise attacks by enemy aviation and for countering the various types of enemy air activities before the enemy air forces involved are able to reach their targets. On the other hand, aviation constitutes today, without any doubt, an effective means for repelling naval attacks.

The extent to which one controls the air along the coast, therefore, determines entirely what an attacker is able or not able to attempt in the vicinity of the coast or over it.

However deeply coastal defenses may extend into the interior, attacking aviation, if it possesses air supremacy, will always be able to reach its targets. The aviation of the defense will always be the means charged with the mission of preventing this.

Considering coastal operations, therefore, in their general strategic aspect, we reach the conclusion that aviation has transformed its character by becoming the prime and decisive factor both in attack and defense. The ideas and doctrines of coast defense of six years ago are now obsolete, as are also most of the offensive means in which dependence was placed at that time. By the same token, the coast defense organizations of six years ago are so antiquated that they now require revision in the light of the new development of war.

A good half century ago it was usual and logical to consider the naval blockade a part of coastal operations. This blockade, with the means available in those days, possessed a tactical character which the evolution of those means has transformed, little by little, into a great strategic operation, and finally, during the first World War, the naval blockade came to constitute the entire, or nearly the entire, object of naval activity.

In conformity with orthodox strategy, naval warfare passed through two different phases of development, the struggle for the control of the seas and the utilization of the freedom of the seas. This orthodox strategy had already been laid aside even at the time of the first World War. Neither of the two sides, the stronger or the weaker on the seas, waited for the great and decisive clash of naval forces of the first phase before passing on to the second phase, that of utilization of the seas. The stronger of the two ran the risks and suffered the effects of a sort of blockade, the submarine blockade of the weaker side, but made use of the seas for all the purposes corresponding to the second phase. The weaker of the two, unable to make use of the seas in those theaters of operation where its inferiority was manifest, caused, by means of its submarine blockade, such heavy losses in the shipping of the stronger side that it was on the verge of paralyzing its activities on the seas.

The conduct of war is becoming unified. On the seas, aviation cooperates with the surface forces, and is a factor which at times is a preponderating one. Naval forces without aviation would be powerless against an adversary endowed with it. In the war in the Pacific, action between naval units became a rarity, battles on the seas being conducted between the naval units of one side and the aviation of the other.

In the West, the submarine blockade of the weaker side was assisted to a certain extent by aviation, but it was the aviation of the other side which, in cooperation with surface units, made the antisubmarine activities more effective and overcame the submarine blockade.

The aviation of each side engaged in a blockade on its own account, attacking enemy ships and enemy naval units both on the high seas and in their ports, dropping mines in places where they were obliged to pass—as the submarines had theretofore done.

The blockade is an amphibious operation in which both naval and air forces cooperate. Both blockades and triphibious operations dominated the military operations in the West. Even the continental operations, in view of the importance of the factor of logistics, were largely dependent on the transportation of troops and supplies by sea, on invasion operations against the African and European continents by way of the seas, defying submarines and aviation, but attempting to annul the effects of their action. Triphibious operations dominated the war in the Far East owing to the nature of the theater of operations in the Pacific. In nearly all their theaters of operation, the two opposing sides were able to attack one another only across very great stretches of water. The progress made by aviation permitted the bridging of many of these distances and the employment of fixed bases either previously existing or rapidly seized. Mobile bases (airplane carriers) took care of the rest.

Operations on the coast are the first tactical phase of every campaign, which is strategically prepared by means of air and naval supremacy. Ground operations follow landing operations and are constantly supported by aviation from the sea and by naval forces. In both the West and the East, the coast has become a thing of prime importance in military operations. These latter have been profoundly altered because of the evolution that has occurred in means of combat. A revision of the means of action and of the organization of coast defense is imperative, since it is logical to suppose that any alterations they may have undergone will not be equally revolutionary.

But coastal operations are not an end in themselves. The study of political and strategic situations must serve as a basis for determining the nature and importance of the operations which, in the light of the lessons taught by the two World Wars, may be expected on the coasts of every country. A subsequent examination of the tactical aspect that may characterize these operations will indicate the organization of the means and the extent to which they should logically be adopted.

Dispersal of German Weapon Production

From *The Aeroplane* (Great Britain) 20 July 1945.

The dispersal of German "secret weapon" factories was illustrated by two reports of the Allied military authorities in Germany. The first dealt with the V-2 weapon factory near Nordhausen, in the Harz Mountains. Eight hundred feet below the ground, some 12,000 people, practically all inmates of the nearby concentration camp, worked twelve hours a day in the underground machine shops. Some seventy-five miles away, near the small town of Schmiedeback, in the mountainous Thuringian Forest, the plant for the production of the liquid oxygen was situated, also several hundred feet below the ground. Other factories, producing components, chemicals, or the high-explosive material for the warhead, had been installed at similar distances in inaccessible parts of the Harz or Thuringian mountains.

Japanese Invasion of India

Digested at the Command and General Staff School from an article in *SEAC Souvenir*, the Services' newspaper of the Southeast Asia Command (British).

THERE are probably not more than six motorable roads in the whole of the 25,000 square miles of the Central Front in Burma, and only two railways (with variable gauges). One comes up from Calcutta on the Bay of Bengal and ends at Ledo, while the other comes up from Mandalay and serves the former Jap bases of Mogaung and Myitkyina (see sketch). The first lay in Allied territory; the second in Japanese.

Fourteenth Army's assessment of the enemy's next move turned out to be accurate. The Japs had planned a surprise stroke. It was no less than invasion of India via Imphal and Dimapur.

The Jap purpose was threefold: (1) To climb the wall of the mountains beyond the Chindwin and fall upon the main Allied advance base at Imphal, breaking our grip on the entire frontier. (2) Securing the line of the Imphal-Kohima supply road, to sweep on into the Assam Plain and get astride the Bengal-Assam railway. Thus they would cut the life-line of General Joe Stilwell's advance towards Myitkyina along the Mogaung Valley, and force him back on Ledo. (3) To overrun the Assam airfields and disrupt the airborne traffic from them over the Hump to China. Thus the Japs would dry up the petrol flow which kept General Chennault's 14th Air Force bombing over Occupied China and Japan, and stop all munitions supply to Chiang Kai-shek's armies. By these few bold strokes the Japs might sever all communications with China and force her out of the war.

Said General Mutaguchi's Order of the Day to the Japanese invasion forces on the opening of the campaign: "*This operation will engage the attention of the whole world and is eagerly awaited by a hundred million of our countrymen. Its success will have a profound effect on the course of the war, and may even lead to its conclusion. We must therefore expend every ounce of energy and talent to achieve our purpose.*"

Accordingly, 100,000 crack Imperial troops were detailed for the task.

It was on the eve of 17 March 1944 that the first Jap column forded the Chindwin by way of Homalin. A second column made the crossing at Thaungdut, thirty miles southward.

Ahead of the main assault forces screens of patrols had been operating across the river for several days. For a time they deceived us as to their direction.

As the Jap columns moved through the mountains towards Imphal Plain their planes bombed the combat area.

Five days after passing the Chindwin the Jap army stood on the frontier of India, gazing down from the Somra Hills into Assam (22 March). They were engaged by British and Indian troops and had to fight their way forward. But the flag of the Rising Sun had been raised on Indian soil for the first time. For the second time since the New Year, Tokyo was all lit up with victory. The march on Delhi had this time really begun. This ballyhoo was not without effect in India.

The Japanese offensive was unfolding not only as expected but substantially as desired. The enemy banked on a quick decision. In claiming that Imphal would fall by 27 March it is probable that Tokyo radio was not ahead of High Command schedule.

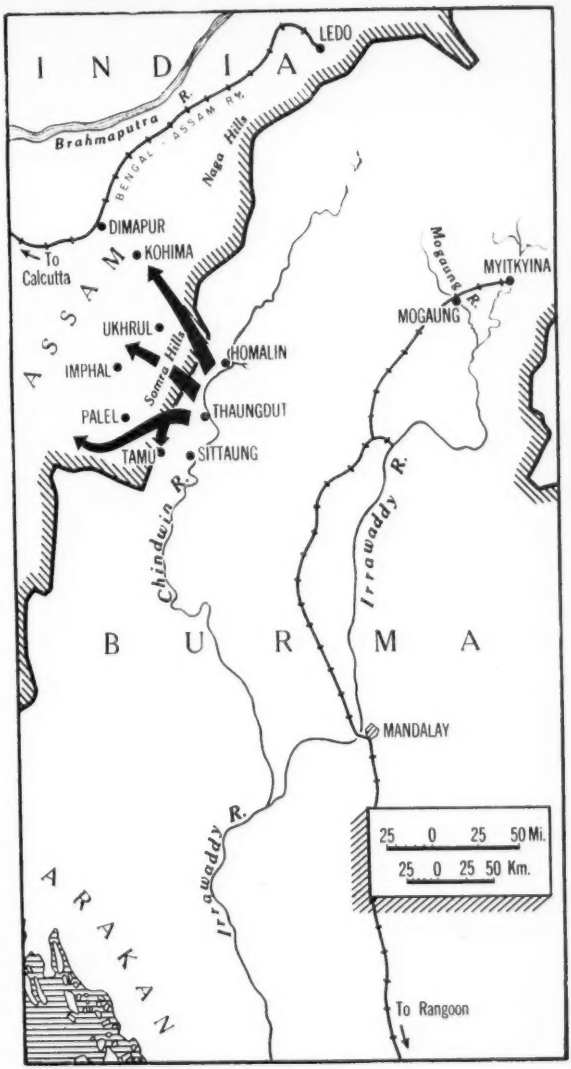
Even before the first Jap platoon had crossed the river, General Slim had plans to meet the situation. These plans involved a withdrawal from certain areas so as to concentrate our forces and to throw the disadvantages of long and vulnerable communications on the Japanese instead of on ourselves. They provided for the holding of the Imphal Plain and the denial of that area and the food it contained to the Japanese. One of the requirements was that the 17th Division should be withdrawn.

The delays caused to the withdrawal of the 17th Division by enemy attacks enabled

the Japs to penetrate deeply round the flanks of the division. To deal with this, the 4th Corps Commander ordered the 23d Indian Division to assist the withdrawal of the 17th Division along its 160-mile road. This placed a considerable strain on the 23d Division, which already had commitments in the Ukhrul area, and it left no reserve in the Imphal Plain, but the task was carried out successfully and the risk entailed was justified. Supported by light tanks of the 7th Cavalry, the 23d Division attacked vigorously and after heavy fighting drove out the enemy, thus very materially assisting the continued march of the 17th Division towards Imphal.

Now also converging on Imphal from Tamu came Major General Douglas Gracey's 20th Indian Division. The Frontier Force Rifles covered the right flank of the division as it drew back towards Palel. The Japs followed closely.

One of the enemy's main objectives in this sector was Palel airfield. They fought hard for it, and when regular attacks failed they tried tricks. One extraordinary device, apparently designed to create panic by its nature, was to march steadily forward in columns of threes. When they came within the sights of the 20th Division machine guns, they were scythed down in rows of threes.



So the ordered march of the outpost divisions continued towards Imphal.

West of Tamu a swift enemy thrust, supported by armor, was sharply checked when tanks of the 3d Carabiniers lay in ambush and hammered the enemy in the first armored clash on the Burma frontier. Meantime, other Jap units had reached the fringe of Imphal Plain and were less than eight miles south of the town. The Seige of Imphal had begun.

The offensive was now fully unfolding along the entire frontier. Another Jap

punch, farther north towards Kohima, was being driven home with extraordinary violence.

It would be cardinally wrong to suppose that in the general course of the campaign the Fourteenth Army Commander conformed to the invader's idea. On the contrary, he had his own. He had decided to fight the Jap, not at the end of a long British line of communications but at the end of a long Jap line of communications. He did not invite the enemy assault, but he made all preparations to receive it and break it.

By the time the invaders approached Imphal it was not so much a fortified base in a "state of defense" as a powerful offensive springboard. So it proved to be.

The Japs came quite near enough. They reached positions both in the hills above the Imphal airfield and northeast of the city. But prompt action by the newly arrived 5th Division, reinforced by tanks, dislodged them and prevented their guns from doing any material damage.

Not less energy or talent had been expended by the Imphal garrison to frustrate this purpose. Infantry, artillery, armor, and air forces had been assembled in adequate strength to meet any possible threat. The Jap assaults crashed like waves in a heavy sea against the fortress-walls of Imphal; but it was the waves that broke.

As the invaders swept into the plain they were met by the cannonade of hundreds of artillery, tanks, machine guns, and the rifles and grenades of the inflexible infantry. As in Arakan, the tanks inflicted very heavy damage, climbing right up to the top Jap hillside bunkers to blast them at point-blank range. The salvos of the artillery rolled like thunder through the valleys.

The war in the air was not less devastating. In the Battle of Imphal the Japs brought up fighter formations for the first time for many weeks. They lasted a rather shorter span than they had in Arakan. Third Tactical Air Force swept them out of the Burma skies, then turned completely to close and remote target support for the Fourteenth Army. They shot up and bombed enemy concentrations, dumps, transport, bridges, river craft, and locomotives. The monsoon in no way diminished their activity.

All over enemy-held Burma ranged the medium bombers of Eastern Air Command. The "heavies" went as far as Bangkok. In three days U.S. AAF sweeps over the Jap air bases notched sixty-three enemy planes on the ground. Already by the time of Arakan they had closed Rangoon for ocean-going supply. Now our planes swept the Irrawaddy and the Chindwin to deny the enemy his vital river traffic. The railway they never permitted to remain in full working order. The final results of this collapse of his logistics were shown later as the triumphant Allied pursuit uncovered the appalling state of the retreating Japanese army.

Appearing suddenly out of the Somra hills, the Japs surged over Kohima Ridge, cut all the roads, and completely isolated the town, for there was no air strip.

The garrison of Kohima, together with a few hundred of convalescent soldiers and civilians, totaling 3,500 men, stood up to the full fury of the Japanese 31st Division.

For fourteen days and nights the defenders of Kohima held the bridgehead to India. They knew help was coming, for brigades from both the 5th Division and 7th Division Arakan veterans, also the British 2d Division, had been flown up to Assam and were advancing on Kohima. The Royal West Kents, having touched-down at Dimapur, were able to force their way in before the last entrance was barred by the investing Japs. But though they realized the role they were expected to fulfil, many of this devoted band did not survive to know the glory they were to receive.

Smashing their way into the town itself, the Japs thought that at last they had overcome the garrison, only to experience once again the stubborn, unquenchable spirit of British and Indian troops who contested every inch of ground. So costly did the defenders make daylight assault that the Japs abandoned all the sun's hours to the

guns and only put in their infantry under the cloak of night.

But the defense of Kohima was the prelude to a still bloodier struggle—its relief. Lieutenant General Sir Montague Stopford was rushing his 33d Indian Corps from the far side of India towards the battle. Stopford's orders were to (1) raise the siege of Kohima and (2) drive southward down the Imphal road to link with the 4th Corps.

No fiercer battles have been fought on any front than those which followed. Kohima's ordeal had entered its third week before the first reinforcements could reach it, crawling in by the only nullah [gully] which gave access to the garrison. Later, the relieving forces drove a wedge through the enemy wide enough to evacuate the most seriously wounded.

The battle was far from finished. The Japs were still in strength enough to launch a last furious all-out effort to capture the town.

While this costly stand-up battle was raging round Kohima, equally energetic action was going forward on the flanks. To guard against an enveloping movement from the Naga Hills and to threaten the Japs' own lines of communications the British 23d Infantry Brigade had been sent out to comb the surrounding land, which has since been described as the wildest and most trackless in the Himalayas.

The brigade were themselves supplied by the unfailing Air. They collected their rations in jungle clearings, sometimes fighting it out with the enemy for possession. They climbed cliffs, cut corridor ledges along precipices, bridged chasms by single logs, hauled their pack-animals belly deep through mud, and dived into flooded rivers to retrieve precious stores swept from the mules' packs. With ambush, night march, and the Chindit version of the Indian rope trick they foxed the Japs, and took from them a ten-to-one toll in casualties.

All the enemy's efforts to regain Kohima had now been smashed, though the roads leading southward from it remained under his fire for several more days. With the exception of the enemy strongpoints still holding out in Naga Village to the left of the road and on Aradura Hill to the right, the last Jap was forked out of the elaborate network of bunkers on Kohima Ridge on 14 May, thus bringing to an end a forty-day-and-night nonstop slugging match which cost the enemy 4,000 dead. It took another six weeks of heavy fighting by Punjabi and Gurkha troops to clear the enemy completely. Our own losses were not light, and included a high proportion of officers.

Down in Imphal Plain the 4th Corps had also completed their task. The flood of fire which they had showered on the invaders once they left the cover of the foot-hills had been so shattering that they quickly pulled back and entrenched themselves in hillside bunkers. Dive bombers, with Allied artillery and tanks beat a ceaseless triple tattoo on these positions until the infantry closed in for the kill. The word is true, for by the end of May not one Japanese soldier remained above ground in all the 700 square miles of the plain. The crisis of the Battle of the Central Front was past—for us. For the enemy it was beginning.

The break-out from Kohima was impressive. Armor and infantry advanced under the smoke and fire screen of guns and mortars, dive-bombers, and fighters.

The enemy was now everywhere on the defensive. His greatly reduced army were strewn along the Imphal Road, though their grip at either end of it was being broken.

The condition of the enemy everywhere deteriorated. Our aircraft and raiding columns had so disrupted his lines of communications that for whole regiments supply simply ceased. The Jap, that legendary soldier who was supposed to live on a handful of rice from a little ration bag hung round his neck, began in fact to have no other ration. They crawled, dying, to the feet of the giant marble and gold-leafed idols in the Buddhist temples to end life. And, ironically, many died of starvation with full raton bags of rice around their emaciated necks—rice which they could not eat.

The last of the invaders staggered out of India on 25 August. Fourteenth Army advanced columns reached the Chindwin River on a broad front a few days later. Sittaung and Thaungdut were occupied on 4 September.

In the entire Burma campaign, 1944, the Fourteenth Army and Eastern Air Command had annihilated five Japanese divisions and inflicted fearful losses on others, besides taking more prisoners than in any previous campaign. India was safe, the enemy's power in Burma shattered. From the air he had been banished absolutely, and at sea the Eastern Fleet rode the Indian Ocean unchallenged.

Assault Groups versus Armored Belts

Translated and digested at the Command and General Staff School from a Russian article by Major B. Azbukin in *Krasnaia Zvezda* (Red Star) 19 April 1945.

THE Germans often resorted to deeply organized defensive positions consisting of many fortified zones and natural defense lines with special screening positions. Ordinarily, the basis of such a defense zone was from two to four lines of trenches, either continuous or discontinuous, some 150 to 200 meters apart and connected with one another by a well developed network of communication trenches. Back of these trenches was a system of strongpoints.

These strongpoints were, as a rule, adapted to all-around defense. All stone structures were carefully camouflaged and converted into weapon emplacements. The intervals between strongpoints were always covered by dense machine-gun and mortar fires. In order to give still greater solidity to the defense, the enemy reinforced it with groups of tanks and self-propelled and assault guns disposed at critical points in the vicinity of the strongpoints. This system of mobile weapon emplacements extending as a belt around the strongpoints and based on the employment of the fire and maneuver of armored vehicles has received the name of "armored belt."

The tactics of the units composing the armored belt were as follows. Upon the appearance of our tanks, the self-propelled guns and tanks opened fire from a distance of 400 to 1,000 meters. They were supported by the fire of assault guns and field batteries. Whenever they failed to halt our forces, the German armor, supported by their infantry and artillery, counterattacked. If the counterattack was successful, the enemy consolidated his positions on whatever terrain line he may have reached. His armor took shelter in the folds of the terrain, behind hills, or behind stone buildings. Most often, however, the enemy returned to his original positions. In doing so, the armored vehicles backed up without turning around, in order at all times to keep their fronts, which carry the thickest armor, in the direction of our fire.

Some sectors of the enemy's defense were copiously saturated with armor. During one of the late actions, one of our units, after advancing about six kilometers, came onto an armored belt with a frontage of about one kilometer. They discovered here four ambushes with from four to six tanks and self-propelled guns in each. As soon as this unit attacked, the German machines hurried out to open firing position, fired a few shots, and again took cover. When our artillery laid down its fire on the ambushes, the German machines cleared out, but in twenty or thirty minutes again showed up in another place and opened fire.

The breakthrough of a defense zone which possesses an armored belt necessitates the employment of new methods of action. During the period of the offensive near Leningrad, our assault groups, consisting of tank, artillery, and rifle units, were often pitted

against German armored belts. Now these assault groups, the fire power of which is very great, are successfully employed in a variety of offensive operations.

The composition of the assault group depends on the importance and character of the objective to be attacked. Usually, the group consists of a company or battalion of infantry, a few small engineer units, three to five tanks, and an equal number of self-propelled guns. Experience has demonstrated that the inclusion in the group of batteries of medium-caliber antiaircraft artillery and of 120-mm mortars is very expedient.

The following is a typical example of action by an assault group of this type against the enemy's armor in breaching his defensive positions.

In the course of stubborn fighting our troops broke through the line of German trenches, wedged into their dispositions four or five kilometers, and seized a number of their strongpoints. The Germans hurriedly brought reinforcements from other sectors of the front, established an armored belt in the zone of our main attack, and began counterattacking.

Three assault groups were then formed. The assault group operating on the right flank of our unit was ordered to crush the armored belt, to approach an inhabited place, and then occupy it.

The commander of the group, together with other officers, reconnoitered the area, located the sector for his main attack, and worked out all details of cooperative action. At six o'clock in the morning the group moved to its position of departure.

The group assumed the following battle formation. The tanks, stretched out in a line, took the lead. After them, at a distance of 200 to 300 meters, followed the self-propelled guns together with a rifle company and a platoon of submachine gunners. The positions of the 152-mm batteries and antiaircraft and antitank guns which used direct firing were located at a distance of 600 to 800 meters from the main line of resistance.

The development of the battle confirmed the correctness of the commander's decision. At the prescribed time the artillery detailed for direct firing opened fire on the reconnoitered and clearly visible targets. At the end of ten minutes the tanks and infantry moved forward to the attack. From the very outset they were met by the concentrated fire of the enemy's armor and his batteries firing from the depth of the defense. The commander ordered the direct-firing guns to pound the enemy's tanks and the rest of the artillery to neutralize his batteries.

The heavy guns directed their fire on three Tiger tanks that had crept out from behind a hill and were beginning to fire on our own tanks. In a short while, all three of the German machines had been stopped and one of them was enveloped in clouds of smoke. The remainder of the German tanks and self-propelled guns began pulling out in the direction of the road intersection.

At the end of half an hour the Soviet tankmen, pressing close on the heels of the withdrawing enemy, seized the road intersection. In their wake followed the infantry. Their further advance, however, was hindered by the fire of German tanks, direct-firing weapons, and artillery batteries in the depth of the enemy position. It became necessary to displace our artillery forward, closer to the front, but the open terrain prevented this till it became dark. Counter-battery fire was conducted by the accompanying artillery. Our infantry and tanks reached their objective.

Thus in the course of the day the assault group had fulfilled its first mission. It had liquidated the tank ambush, had seized the tactically important road intersection, and had inflicted heavy losses on the enemy. Under cover of darkness the remainder of our guns drew up to the vicinity of the road intersection. The assault group was now preparing for further action.

When daylight came and a new attack by the assault group was started, the situa-

tion became somewhat complicated. On the approaches to a strongpoint our tanks were met by organized frontal fire and fire from a flank, where there also existed an enemy armored belt consisting of some eight armored vehicles. When the commander ordered the destruction of this belt, all the guns of the assault group opened up on all visible enemy tanks and artillery.

Toward the end of the day the group succeeded in breaking the resistance of the Germans and in repelling all their counterattacks. During the course of the fighting it became necessary to reinforce the assault group with four additional tanks transferred from another group.

This episode shows that the creation of assault groups is entirely justified. With constant reconnaissance and properly organized cooperation, an assault group is able to inflict great losses on the enemy, both in men and matériel, and to disorganize his defense regardless of the presence in it of a special armored belt.

Functions of Air Landing Troops

Digested at the Command and General Staff School from an article by F. J. C. P. in *The Journal of the United Service Institution of India* January 1945.

THE late Major General O. C. Wingate, talking of his Brigades of Deep Penetration, often said: "We are the airborne troops of the future." His argument was that the function of his troops, now universally known as the Chindits, was to penetrate to the vitals of the enemy and there wreak havoc. Whether they reached their scene of activity by marching (as he did in 1943) or by air (as in 1944) did not affect in any way their true function.

Before letting loose one's thoughts on this subject, it is necessary to repeat the meaning of the term "air landing troops." They are not parachute troops or gliderborne troops, whose function is to drop in the rear of the enemy positions and carry out certain special tasks to facilitate the advance of the main attack. These troops may reasonably expect relief within a few days, and therefore have no heavy weapons or administrative organization on a big scale in their composition.

Air landing troops, on the other hand, present a very different picture. The term merely means troops carried to their scene of action in aircraft. Their composition is therefore only limited by the carrying capacity of the aircraft available, and no doubt in the future we shall see armored formations lifted as readily as infantry units are now. Within this limit, the composition of the force must be dictated by the task they have to perform, and this leads one to consider the nature of these tasks.

Now it seems to me that the time has not yet come when a whole campaign can be fought and won by airlanded troops alone. It will come, but the time is not yet. They must therefore still be considered as a diversion to help on the main armies, and consequently must operate in such a manner that they contain or destroy enemy troops greater in number or in importance than themselves. Their scene of action, therefore, lies in the enemy area where lines of communication can readily be cut, and where they can threaten or operate against centers vital to the enemy's campaign. (These centers may be of political, economic, or military importance).

They should not be employed in the immediate rear of the enemy forward troops, for, as we shall see later, they take time to arrive, and the enemy would be able to divert portions of his nearby reserves to crush the diversion in its infancy without seriously affecting the main issue. This is the task of parachute troops, with their rapid rate of arrival, light equipment, and elusiveness.

Let us consider some of the characteristics of an airlanded formation, so that its use can be defined more closely. To start with, what is its composition? It is, or can be, a force of literally all arms. An infantry division,

especially one equipped on an animal and motor transport basis, can be lifted *en bloc*, complete with its field, antiaircraft, and antitank artillery. Light tanks are also a feasibility. Stores present few problems, and it is only when we come to corps and army troops of large sizes and weights (medium artillery, heavy vehicles, and tanks) that we are, at present, compelled to call a halt.

Next, what are the "mechanics" of landing? First, a landing area or, more probably, landing areas, must be selected which can be *swiftly* made into a landing strip for heavily loaded transport aircraft. This involves flatness, unobstructed approaches, alignment in accordance with the prevailing wind, and freedom from obstacles difficult to remove. In addition, gliders must be able to land in the vicinity without any preliminary work at all. The selection, therefore, is a vital task, which must be carried out without giving a hint of its object. Air photos, air reconnaissance, agents' reports, and possibly landings of specialists by parachute or light aircraft may be employed.

The selection made, the landing now is planned in detail. Who goes first? and how? The virtual certainty is that only gliders or light aircraft will be able to land on the site in its unprepared state, and that dictates the composition of the first flight—engineers, with graders and bulldozers, in gliders, plus infantry to protect and assist the working party. Also the Royal Air Force must be represented on the ground, and signals, in order to decide when aircraft can use the strip being prepared and to carry out the vital and complicated control of take-offs and landings.

As soon as the strip is ready, the transport aircraft can fly in, but a one-way strip, probably without adequate turning space and a return track, is limited in its capacity. Particularly is this so in the case where the dust on the strip will be stirred up in dense clouds by the airscrew and temporarily reduce visibility to nil. However, it is only a matter of time before infantry, field, antiaircraft, and antitank guns can all arrive. Fighter aircraft can arrive too, and a force of all arms is in being and ready for action in the heart of enemy territory.

Two assumptions have been made so far. One is absolute local air superiority for the duration of the landing. This is a *sine qua non*, particularly if any part of the fly-in is to take place in daylight. Secondly, freedom from enemy ground interference before adequate protective forces have arrived. This is not so difficult to achieve as might be thought, provided the landing sight is well selected. It should be in an area either where no large mobile enemy forces are readily accessible, or in one where the natural obstacles between it and the enemy force will prevent or delay the enemy's early arrival. The element of surprise inherent in such an operation works in its favor, and a study of the time and space problem from the enemy point of view will indicate clearly the suitability or otherwise of the site.

One final characteristic of the airlanded force. It can operate, by means of its air line of communications, for a considerable period and over a considerable area. The time can be measured in months, and will vary according to the climate, terrain, and intensity of operations. But it cannot go on for ever. Relief is essential, either by exchange with fresh airlanded troops, or better still, by the arrival of the main ground forces.

What, therefore, can we deduce about their tactical or strategical use? The ideal, perhaps, is for a strong force to be placed in an area whence it could strike against two or more centers vital to the enemy for one reason or another. This should cause the enemy commander either to tie up considerable forces to guard against several contingencies, or to deflect a force to destroy the intruders. A combination of the two is probable, and the commander of the airlanded troops is then faced with a problem which has several attractive features.

If the enemy counterattack force is weak, he can ambush it en route, and offer battle on ground of his own choosing in order to destroy it. If it is too powerful for him, once his force is landed, he can if he wishes

evacuate his landing ground and operate in smaller detachments, concentrating against any target he selects —what time the counter-attack force must keep concentrated (and slow moving) or risk destruction piecemeal It may be that he can elect to make a "fortress" of his landing ground, and sally out from it to destroy small enemy forces or commit mayhem upon enemy headquarters and vital points.

At the same time that this is going on, the main land armies must assume the offensive. The whole operation must be an example of team work. If one fails to make its presence urgently felt by the enemy, powerful reserves become available for action against the other. The object should be to place the enemy commander in a position where he is in doubt not only *when* to throw in his reserves, but against *which* of two serious threats. The one in his rear area may prey upon his mind, but his problem is complicated out of all proportion if he has to watch a really powerful offensive (not merely an attack) against his forward positions. To counterattack both weakly courts disaster; to counterattack one transforms the other "threat" into an actuality which may well cause the total collapse of his forces.

Finally, one principle of war should not be forgotten: economy of force. The airlanded troops will, or should, be operating in an area where the opposition will be largely composed of line of communications troops. Their fighting value will be below that of the airlanded infantry, and their supplies of weapons inferior to those which can be deployed against them. Therefore a careful estimate should be made of the tasks facing the airlanded force, and its size and composition should not exceed by a man the number, with reserves, necessary for the task. In this connection, the estimated time of relief of the force by the oncoming main armies will have a very important bearing.

Battles in Miniature

From a British source.

A team of British naval experts have for years been fighting a war of their own in specially-built water tanks using scale models of British warships, miniature torpedoes, mines, and bombs. High-speed precision cameras film the whole action. The team consists of highly skilled constructors, engineers, mathematicians, physicists, chemists, and metallurgists of the Admiralty Naval Construction Department who are responsible for the design of the Royal Navy's warships. Their job is the designing and producing of the "perfect" warship according to present-day standards irrespective of whether it be a battleship or an aircraft carrier. These tests are carried out to enable them to compile statistics and data of performance as well as reaction to under-water explosions under action conditions. In addition to carrying out laboratory experiments, men of the Royal Corps of Naval Constructors go to sea with the Navy to gain first-hand experience, so that the best possible workmanship and materials shall go into the design and construction of all ships both building and refitting. All these tests and experiments are carried out before the plans of any new class of ship are handed over to the shipbuilder and the keel laid down. Ships undergoing major refits are also modified to conform with the latest information of ship construction and performance.

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